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1958-59 WSE PRESIDENT WILLIAM R. MARSTON

THE PROFESSIONAL DEVELOPMENT OF SCIENTISTS AND ENGINEERS—PAGE THREE

Vol. 11 JUNE, 1958 No. 1

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The theme of the 2nd National Heat Transfer Conference and Exhibit will be industrial and practical applications of heat transfer, plus some theoretical aspects. There will be two technical sessions going both morning and afternoon. Once again, the Conference will be co-sponsored by the American Institute of Chemical Engineers and the American Society of Mechanical Engineers.

The Program Chairmen — A. S. Foust, Professor of Chemical Engineering, Lehigh University, for A.I.Ch.E. and Sigmund Kopp, Chief Application Engineer, Alco Products, for A.S.M.E. — are bringing together more than 50 papers on a wide range of heat transfer topics. There's sure to be a great deal that will appeal to everyone. These papers will be pre-printed and distributed as part of the registration fee.

A high-spot of this year's event will be the Exhibits of leading manufacturers in the heat transfer field. Featuring the latest in equipment, materials and techniques, these exhibits are certain to provide highly useful information and data for all. A partial list of companies which have already scheduled exhibits includes: American Heat Reclaiming, Baker Perkins, Bendix Computer, Cardox, Curtiss-Wright, Dow Chemical, Kontro, Monsanto, MSA Research, National Carbon, Parks-Cramer, Republic Steel, Royal McBee, Thermon, Whitlock, Wolverine Tube.

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COVER STORY

We present William R. Marston, the new president of the Western Society of Engineers, on this issue's cover.

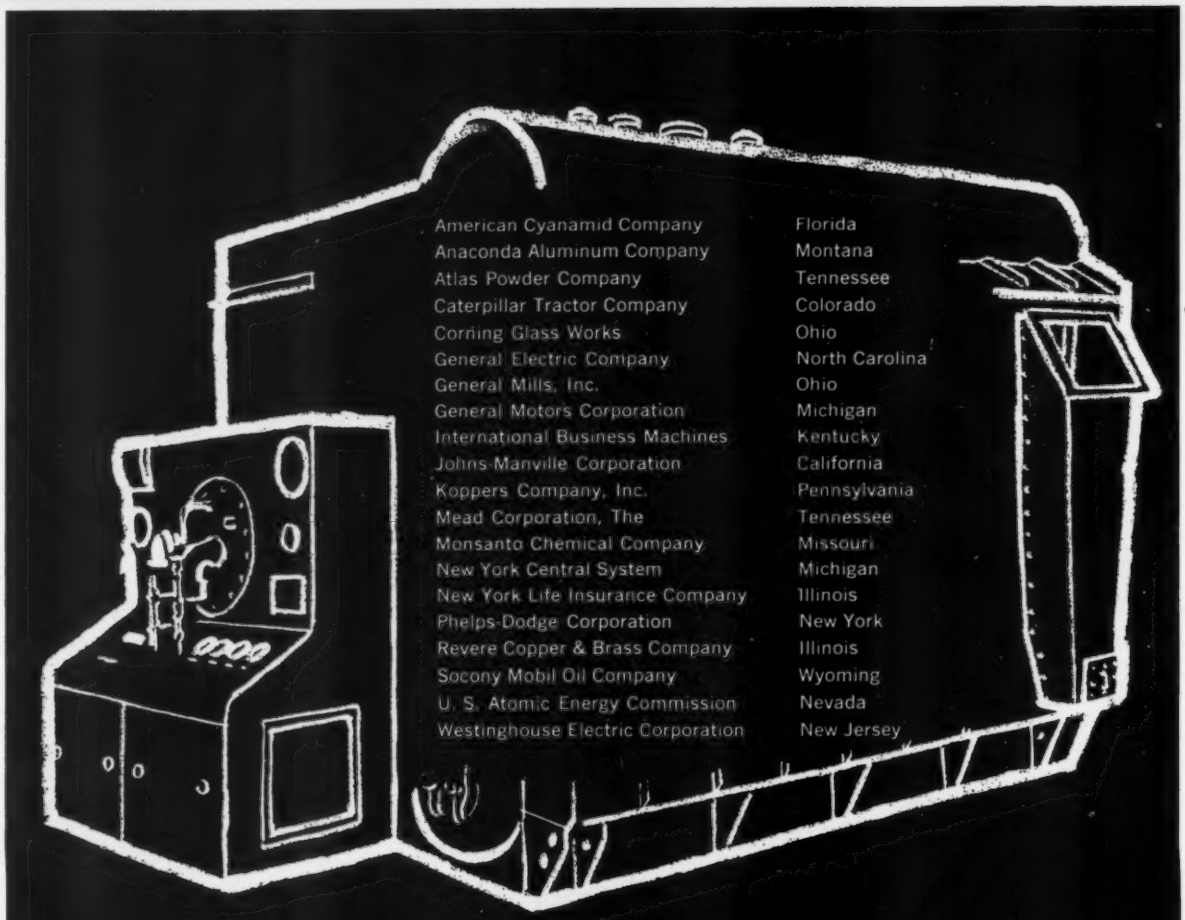
Mr. Marston received a B.S. degree in Railway Electrical Engineering from the University of Illinois in 1931. He subsequently became a staff engineer for the Chicago Surface Lines. He remained with that organization until 1942 when he was employed by the Office of Price Administration as a business analyst. In 1943 he was placed in charge of a transportation unit of the Mileage Rationing Branch of O.P.A.

Entering the Naval Reserve in 1943, Mr. Marston served in the Southwest Pacific.

In 1950 he associated himself with the City of Chicago as deputy city traffic engineer, the position he still holds.

Mr. Marston joined the Western Society of Engineers in 1936, and served as a trustee, from 1951 to 1954. He served as WSE treasurer during 1955-56; 2nd vice-president, 1956-57; and 1st vice-president, 1957-58.

He is a past president of Illinois Engineering Council; past president, Midwest Section of the Institute of Traffic Engineers; and director of the National Institute of Traffic Engineers.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THE PROFESSIONAL DEVELOPMENT OF SCIENTISTS AND ENGINEERS . . . AN EDUCATOR'S VIEWPOINT

By Fred W. Trezise

Extreme paradoxes may be prepared around the terms "professional" or "professionalism." These words, as applicable to our common practice and understanding, and the concepts built up around them, are quite foreign to the honor and attitudes represented to what are known as professions—the learned professions. It is only necessary to consult a dictionary to see divergent definitions revolve around the term "professional." In the highest sense of the term, if one searches for definitions, four characteristics present themselves: 1. the type of work; 2. the calling, such as the bar, or medicine, or the clergy; 3. another quality is that of a confident relationship between a client and his agent; 4. I believe standing out to my mind as paramount is what I would be pleased to call an attitude of mind. A profession is not a class, not a calling, but an attitude of mind.

My reference to an "attitude" embraces a statement found in a momentous report on "Evaluation of Engineering Education," submitted and recently published by the American Society for Engineering Education. This report, more commonly known as the Grinter Report, carries this statement: "The broad social goal of engineering education includes a development of leadership, the inculcation of the deep sense of professional ethics and general education of the individual. The development of both a personal philosophy which will insure satisfaction for the pursuit of a productive life and the moral and ethical values consistent with the calling of a professional engineer."

Mr. E. L. Chandler in the March issue of *Civil Engineering*, makes this statement, regarding a "professional" person: "No one can rightfully claim to be a 'professional' person unless he is motivated for a desire for service. 'Professionalism' is idealistic. Without idealism there can be no true profession. A group of men form a profession only as they command the respect of the public and inspire confidence in their integrity and their belief that they are truly serving the general welfare. If service to mankind is taken as the criterion, engineering must be regarded as meriting professional status." In other words, a profession is based on an attitude of mind, not on a class. It is the profession of an Albert Schweitzer, a Wilfred Grenfell.

Today we have had the opportunity of hearing the viewpoints of three gentlemen regarding their views of the professional development of engineers and how they believe this professional development should have been realized. I presume I should be called upon to express an opinion regarding development of professional attitudes during the formal years of engineering education.

WSE's Contribution

It was with a concern for the development of men to face professional engineering situations that prompted the formation of the Grinter Committee already mentioned. Previous to this time, however, a direct approach to the problem was made by the Western Society of Engineers in Chicago in 1951, when its Educational Committee was commissioned to ascertain the viewpoint of industrial leaders on the deficiencies which they noted in the engineers in their employ. Through their presidents, the question was addressed to 52 concerns of various sizes. Out of 52 inquiries sent out, some 30 replies were received. Representatives of the four founder societies and the Illinois Engineering Council agreed to the worthwhileness of this proposal. Almost unanimously the 30 companies agreed that the technical training of their engineering employees was competent. The deficiencies noted from a number of letters revolved around the need for supplemental education in the field of Humanities and Social Sciences. The following quotes are taken at random from some of the replies:

"Competent and inspiring teaching is of paramount importance in the study of Humanities and Social Science."

"Lack of ability to cooperate and get along with other people."

"Personality, cultural development are combinations we have been searching for."

"Cultural and humanistic development of the engineer both in college and afterward is of major importance."

"Technical education of engineers needs to be considerably bolstered with general educational courses, liberal arts—he should be a 'whole man'."

The findings of the Western Society of Engineers' Committee, and the rec-

This article was part of a panel discussion which took place May 6-7, 1958 under the auspices of the President's Committee of Scientists and Engineers. Fred W. Trezise is associate dean of engineering, University of Illinois, Chicago.

ommendations of the Committee on the "Evaluation of Engineering Education" dated June 15, 1955, are strikingly similar. Three paragraphs stand out in the summary of the latter, or Grinter Report: 1. Inclusion of elective subjects to develop the special talents of individual students to serve the varied needs of society; 2. A continuing concentrated effort to strengthen work in the Humanities and Social Sciences in the engineering program; and 3. an insistence on the development of a high level of performance in the oral, written and graphical communication of ideas.

A further paragraph should be of great interest to industry today, and I cannot over-emphasize its importance. The summary of the Report states further: "Positive steps should be made to insure the maintenance of faculties with intellectual capacities, as well as the professional and scholarly attainments necessary to implement the recommendations of this committee."

Ethics

In any profession, running through its code of principles, is a thread which I would call "ethics." It is a most important feature of any profession—as a profession should be.

The recent stimulating editorial, by Mr. A. Arthur Hemenway, includes the following statement: "A superior sense of professional ethics can come only from a superior sense of values. The point at issue then concerns the most effective way to equip engineers with a superior sense of values. I cannot escape the feeling that a fundamental ethics course would be only another course in methods, with very little substance relevant to the problem."

A profession embraces more than a knowledge of techniques, it is a commitment to the practice of a high degree of tolerance, an objective and an integrity based upon a devoted ideal of social responsibility.

I believe ethics cannot be taught, it must be lived. It is best conveyed by precept. The example of a highly respected teacher is the principal factor for the inculcation of qualities of honesty and integrity. Subscribing to a code of ethics, or taking an oath at the time of graduation, as is the case in certain professional fields, does not assure honorable devotion to a profession. Neither can it be taught as subject matter in a college classroom. I am reminded of a certain case, which came to my attention, at a disciplinary committee meeting of which I was a member on a prominent midwestern college campus. The student was brought before the committee for having cheated on the final examination in a course entitled, "Christian Apologetics and Ethics."

When the student comes to the college campus, he brings all his qualities—social, spiritual, physical and otherwise, together with what intellectual capacities he might have. He is more than a name in a class book, or of only sufficient density to cover a number on the back of a seat.

The function of a teacher is beyond that of training a student, correcting papers, and serving as authority for a certain grade at the end of a course. Certainly he is not in the teaching profession to make money. He must want to teach and must like people. The great personal satisfactions are the compensatory marginal satisfactions which cannot be bought and are without price. In engaging a teacher, we have suffi-

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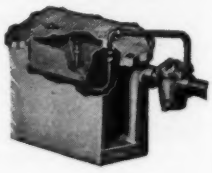

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cient evidence that he is a graduate of an accredited institution, from his application blank. We also can determine, either by personal conference or previous experience, that he can handle the subject matter. We do not hire a teacher to teach subject matter; our teachers are engaged to teach students. An instructor should be interested in the development of the whole man. We are more interested in developing good citizens, and all that that term implies, rather than technically trained engineers. Yes, we have trained engineers long enough, I believe we are going to try to educate them. I think it is about time we built our own education program—the best *we* know how!

No one event within recent years has had the impact upon our educational system, from the kindergarten through graduate college, as the launching of *Sputnik I*. It stirred the imaginations of people around the world. In this country, particularly, the event has so electrified some of us so as to befuddle our sane thinking and create a fear complex which has been the laughing stock of unprecarious, calm and restrained people throughout the world of western culture—just the result the Kremlin had hoped for.

I think it is about time we ran our own race.

Emmett Hughes, of *Times-Life* staff, a day or so ago, in the TV program, "The Great Challenge" stated "that action should not be built on reflexes but on thought." I am not certain that Mr. Hughes was referring specifically to our education problem, but I believe that in the blessings of a free democratic society, we have little to learn from Russia under the reflexes of fear of being overtaken or the despondency of defeat. It is tragic to hear the wailings which come from some of our so-called "enlightened" people.

Dr. H. M. Wriston, ex-president of Lawrence College and Brown University, has stated: "The fruits of free minds are both more varied and more valuable than the products of like minds under rigid control." Charles C. Cole, Jr., in his study, "Encouraging Engineering Talent," brings out the same thought.

Having coached track in a well-known midwestern college, I believe that one admonition to a track man stands out: "Don't look back—run your own race." I have seen a man, particularly in the dashes, lose his head and the race, through a concern for his competitor's position by looking back. In the high hurdles, for example, how disastrous it might be in the rhythm of one, two, three, over, to look around for your competitors.

Don't Look Around

In educational and science program development, any one of the hurdles of missiles, satellites, and propellants, will trip us up if we lose our stride by looking around. With supreme confidence in our American talent, our free, unfettered, broad educational program in an atmosphere of free enterprise, we will be devoid of the reflex of fear in serving the free world.

I would like to take you back to Vancouver, British Columbia, on Saturday, August 7, 1954, at the time of the Empire games. The heralded "Mile of the Century" between John Michael Landy of Australia and Dr. Roger Gilbert Bannister, both better than 4-minute milers, stood out as the capital attraction. Nothing before or since has so captivated the attention of those interested in what constitutes the limit of human endurance.

I would like to have Landy drive home what I have tried to tell you: "I tried to pull away from him in the backstretch of the last lap," said Landy; after he ceased to gasp for breath. "I had hoped that the pace would be so fast that he would crack at that point. He didn't. When you get a man in that sort of a situation and he doesn't crack. you do. From then on I knew it was only a question of time. I looked over my left shoulder to see where he was on the turn, and when I looked back he was ahead of me." He paused, grinned, shook his head and added: "I've had it."

To sum up: The professional development of scientists and engineers then, which is our broad topic, is service to humanity, not service as pawns to a totalitarian state.

Engineering and science are creative professions. Any program of education which is set up must be of such a nature, so that it might serve as a firm foundation of scientific and social advancement. It should be sufficiently broad and comprehensive to serve as a thorough grounding in the basic and engineering sciences.

President Dubridge of the California Institute of Technology has stated that one brilliant creative scientist or engineer may turn up with more ideas than one hundred ordinary ones. The discovery of the brilliant student in the early years of his school life should be a prime objective. This matter of emphasizing the education of the bright student to bring out his full brilliance, does not violate democratic principles. Education is the presentation of opportunities to develop to the full those talents with which a person is gifted.

We should not be entirely concerned with quantity in engineering or science education. In the professions of science, efficiency and performance cannot be expressed as though they were ditch diggers. To dig twice as many ditches we hire twice as many ditch diggers, but to accomplish more in engineering, the proportion does not hold. Progress in the engineering profession is not based on quantity. It would be difficult to express the value of one Einstein, one Fermi, one Kettering in terms of a number of scientists of ordinary brilliance.

(Continued on Page 13)

Inter-University Corp. Formed

Twenty-six leading educational and research institutions have formed an inter-university corporation to be known as Associated Midwest Universities.

Announcement of the action was made May 19 by Dr. James H. Jensen, provost, Iowa State College, Ames, Iowa, who is the initial president of the new organization.

It is planned to establish headquarters for Associated Midwest Universities (AMU) at the Argonne National Laboratory's main site near Lemont, Ill. Argonne is the nation's senior research and development center for peacetime uses of atomic energy.

The Associated Midwest Universities has been incorporated as a not-for-profit corporation under the laws of the State of Illinois. An executive director, whose office will be at the Argonne site, will be selected as the new organization's top administrative officer.

"Argonne welcomes the formation of this new organization to give added impetus to scientific development in the middle-west," said Dr. Norman Hilberry, Argonne director. "It promises to become one of the most active groups of its kind in the United States."

Purposes

The articles of incorporation list three main purposes for organizing the new corporation:

1. To promote, encourage and conduct research and education in all branches of science, including but not limited to nuclear science in relation to all other fields of science.

2. To establish means for facilitating the use of the Argonne National Laboratory and other laboratories by duly-qualified personnel and students from the several cooperating institutions and other research and educational institutions.

3. To establish, maintain and operate laboratories and other facilities as necessary for research and education.

It is anticipated that the new corporation, Associated Midwest Universities, will be a successor to the organization formerly known as Participating Institutions of Argonne National Laboratory.

A meeting of the representatives of the cooperating institutions to complete the transfer was scheduled for June 10. The meeting was held at Argonne's Lemont, Ill., site.

Dr. Jensen said:

"This is an important day in the history of scientific organization in America's middle-west. We anticipate that Associated Midwest Universities will utilize effectively and efficiently the vast reservoir of scientific manpower, knowledge and facilities available in this populous area.

"The purposes listed in the articles of incorporation alone suggest the wide gamut of scientific research and development activities in which this new association might become active. Working together, while maintaining their independence, these centers of learning will offer proof to the world that research and development done in the context of academic freedom can keep abreast of the frontiers of science. We have the manpower, the tools and now the organization."

Two university associations, dedicated to scientific research and education, already exist within the framework of the Atomic Energy Commission. They are Associated Universities, Inc., which is the AEC's contractor for operations of the Brookhaven National Laboratory, Upton, Long Island, New York, and the Oak Ridge Institute of Nuclear Studies, which directs educational and other activities associated with the Oak Ridge, Tenn., National Laboratory for the AEC.

The administrative framework of Associated Midwest Universities is expected to be somewhat similar to that of ORINS.

It should be noted, however, that the AEC contractor for actual operation of the Oak Ridge Natiinal Laboratory is the Union Carbide Nuclear Company, a division of Union Carbide Corporation. In the same pattern, the University of Chicago is the AEC contractor for the operation of the Argonne National Laboratory. Argonne's research is centered at two locations—Lemont, Ill., about 25 miles southwest of Chicago, and at the AEC's National Reactor Testing Station near Idaho Falls, Idaho.

Government

Associated Midwest Universities will be governed by a board of directors made up of eight members. Members of the board would be elected normally for terms of four years each, so spaced that the terms of office of two of the members of the board will expire each year. At least five of the eight members of the board must be members of the staffs of the sponsoring institutions.

Under the articles, the initial board will consist of the following: Dr. Raymond G. Herb, professor of physics,

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University of Wisconsin; Dr. Frank Hovorka, head of Chemistry Department, Western Reserve University; Dr. Robert S. Shankland, head of the Physics Department, Case Institute of Technology; Dr. William L. Everitt, MWSE, Professor of Electrical Engineering and Dean, College of Engineering, University of Illinois; Dr. John Z. Bowers, dean of Medical School, University of Wisconsin; Dr. Laurence L. Quill, head of Chemistry Department, Michigan State University; Dr. Newell S. Gingrich, head of Physics Department, University of Missouri; and Dr. James H. Jensen, provost, Iowa State College, Ames, Iowa.

The draft articles of incorporation and by-laws of Associated Midwest Universities were prepared by a special committee authorized by the Council of Participating Institutions at Argonne at a meeting May 20, 1957.

Authors of the draft articles of incorporation and by-laws were Dean Frederick T. Wall, of the Graduate School, University of Illinois, chairman; Dr. Alvin B. Cardwell, professor of Physics, Kansas State College and H. R. Patton, Comptroller, Carnegie Institute of Technology. They worked in consultation with members of the Council's Executive Board, which authorized distribution of the documents September 6, 1957.

Dr. James H. Jensen, provost, Iowa State College, Ames, Iowa, and also Chairman of the old Council of Participating Institutions at Argonne, said the new corporation's by-laws provides that initial membership in the new association would include any Council member institution which chooses to affiliate with Associated Midwest Universities.

Dr. Jensen added that other educational institutions which have demonstrated active interest in basic science research by offering graduate research programs of good quality leading to doctorates in at least three of the four broad fields of biological sciences, chemistry, engineering and physics may apply for membership in accordance with provisions of the by-laws. Members will be known as "sponsoring institutions," said Dr. Jensen.

Officers of Associated Midwest Universities include Dr. Jensen as president; Dr. Laurence L. Quill of Michigan State as vice-president; Dr. Joseph C. Boyce of Illinois Institute of Technology as secretary and acting treasurer. An executive director will be elected by the association's board and will devote full-time effort to the association.

Dr. Jensen explained that studies toward the development of Associated Midwest Universities began as a result of recommendations in a report prepared by a special committee last year. This committee was headed by Dr. John T. Rettaliata, WSE vice-president, president of Illinois Institute of Technology. The committee had been appointed by Dr. Lawrence Kimpton, chancellor of the University of Chicago, at the request of the Council. The report has been approved by the Atomic Energy Commission.

Library Maintains Welding Patent File

If you are looking for information on patents relating to welding, the A. F. Davis Welding Library at the Ohio State University, Columbus, Ohio, can expedite your search. The library houses a unique, coded, and classified file of over 15,000 patents on welding. The file is currently being completed for 1957.

The file is open without charge to anyone wishing to come and use it with the assistance of the librarian. For a nominal fee, the staff will search the files and forward patent numbers. Ohio State Engineering Experiment Station Bulletin 140 covers the classification system.

The library contains some 6,000 volumes on welding, one of the most extensive collections on welding in the world. Filed here also and generally available are the award designs from the many mechanical and structural design competitions sponsored by The James F. Lincoln Arc Welding Foundation. A. F. Davis, founder of the library, is secretary of The Lincoln Foundation.

A Switch: Body Keeps Battery Warm

A battery vest, utilizing human body heat to keep dry cells warm and active for radio operators in very cold weather, is being developed by the Army, *Engineering News-Record* states. Cell batteries are placed in a vest-like garment worn beneath parkas to capture heat. A cord is used to plug in standard Army radios. The vest has been tested in Alaska with favorable results. It is expected to keep batteries in service ten times longer in 40 degrees-below-zero weather.

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High Voltage Line Put in Service

A new milestone in the electric power industry was reached May 19 when an extra-high-voltage power line was placed in service between the Commonwealth Edison and American Electric Power Company systems.

Customers of these two major utility systems, which together serve a population of nearly 12-million, thus will have added assurance of continued dependable electric service. The 345,000-volt line is the nation's largest for interchange of a bulk electricity supply between two power systems.

The interconnection enables either system to call upon the other for help during an emergency and enables both to operate more economically with less generating reserve.

Announcement of commercial operation of the line was made jointly by Willis Gale, Commonwealth chairman, and Philip Sporn, president of American Electric Power. (The latter company was American Gas and Electric Company until May 12 when it changed its name.)

Completion of the 90-mile tower line between Orland Park, Ill., and New Carlisle, Ind., came less than two years after the project was started. The line and its related facilities cost approximately $28,000,000.

Indiana & Michigan Electric Company, an operating company of the American Electric Power System, built, owns and operates the eastern portion of the new power line. With this new line, the American Electric Power System now has about 600 tower miles of 345,000-volt line in service, with another 185 miles under construction in the state of Indiana. However, the new interconnection is the first of its size between two power systems.

A joint statement issued by Mr. Gale and Mr. Sporn said:

"This interconnection marks a new step forward in exchange of power between systems for emergency purposes, for coordination of maintenance schedules and other operating economies. It will be another assurance of uninterrupted service for customers because either system, in case of emergency due to unexpected outages of generating equipment, can call on the other for help.

"The line will permit both systems to operate with less generating reserve. It is estimated that, at its original planned capacity of 300,000 kilowatts, the interconnection will enable each system to operate with about 200,000 kilowatts less generating capacity than otherwise. At today's costs, this would represent a savings in capital investment of more than $30,000,000 for each company.

"The interconnection, in effect, permits these adjoining systems to get benefits which would accrue from operating them as an integrated producing system yet each retains the benefits of independent operation and load control."

There are 498 steel towers, averaging 145 feet in height, stretching across the countryside to carry the line's six electrical conductors. Each aluminum conductor with its steel core is 1¾ inches in diameter and a single 1,000-foot span weighs one ton.

The new transmission line connects two electric utilities, each with a generating capacity in excess of 4-million kilowatts. Among the country's private systems, American Electric Power and Commonwealth ranked first and second, respectively, in kilowatt-hour sales last year.

Commonwealth serves the Chicago and northern Illinois territory. American Electric Power serves areas in Indiana, Michigan, Ohio. West Virginia, Virginia, Kentucky and Tennessee through the following electric operating companies: I. & M., Ohio Power, Wheeling Electric, Appalachian Power, Kentucky Power and Kingsport Utilities, Inc.

Mileage Highmark

Mileage payments to salesmen driving their own cars on company business have reached an all-time national high of 8.84 cents per mile.

This represents a jump of 12½ per cent from a year ago when the national average was 7.72 cents per mile.

This was disclosed recently by Michael Braude, president of Emkay, Inc., leading national auto fleet leasing firm, which conducted an independent survey on fleet costs. The survey disclosed that payments ranged from a low of 6.5 cents per mile to a high of 11 cents per mile.

The survey covered companies with national sales forces operating in all sections of the country. Regional differences in payments caused by special local conditions are included in the national average.

The survey covered payments by more than 100 companies with fleets ranging in size from 50 to 500 cars. Almost 10,000 cars were covered by the survey.

Most popular mileage rate was 8 cents per mile, paid to 42 per cent of the salesmen covered. Sixteen per cent of the total are paid 9 cents or more, a gain of 6 per cent from the year before.

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IIT's National Center to Continue

The National Center of Education and Research in Equipment policy at Illinois Institute of Technology, Chicago, will continue its program for an additional two years.

Continuation of the program, which was started in 1953, has been announced by the presidents of the two sponsoring organizations—Charles W. Stewart, Machinery and Allied Products Institute, and Dr. John T. Rettaliata, MWSE, Illinois Tech.

Purpose of the National Center is to promote education and research in the methods of industrial equipment acquisition and replacement, according to Dr. Gerald J. Matchett, director.

Stewart attributed the progress of the program to the growing realization on the part of industries that a sound equipment policy is important to the success of every American business enterprise.

"The general application of sound equipment policies also is basic to the continued industrial leadership of the United States, and is bound inextricably into our national security," he said.

"Thus, a better understanding of techniques and applications of equipment policy at one and the same time serves private enterprise and fulfills a compelling public interest.

"Finally, the program is most timely in light of the current emphasis on modernization of facilities to realize higher levels of productivity and cost-saving opportunities."

Rettaliata stated that the work of the National Center is directed toward two main groups—educators and executives or potential executives in business and industry.

"The lack of adequate courses and related programs in the field of equipment policy has been one cause for the shortage of trained equipment analysts. Up-to-date equipment analysis information is virtually impossible to obtain in some localities," he said.

The projected program of the National Center will include courses in engineering and equipment policy. Approximately 100 companies already have sent representatives to such courses at IIT since 1953.

To supplement this program and make it available on a national basis, the Center will continue to co-sponsor two-day conferences at which the latest information regarding scientific techniques for allocating capital expenditures will be made available to industry.

Funds for continuation of the National Center have been provided by the Machinery and Allied Products Institute and the Council for Technological Advancement. To assume continuous liaison between the sponsoring organizations and the National Center, an advisory committee composed of a group of outstanding industrialists and educators has been appointed.

In addition to the presidents of the two sponsoring organizations, the committee includes: Geoffrey G. Beard, president, United Engineering & Foundry Co., Pittsburgh; Robert C. Becherer, president, Link-Belt Co., Chicago; Pearce Davis, Chairman, IIT department of business and economics; Phelps Kelley, executive vice president, Miehle-Goss-Dexter, Inc., Chicago; Richard R. MacNabb, assistant secretary, MAPI, Washington, D. C.; William H. Morgan, Jr., president, The Morgan Engineering Co., Alliance, Ohio.

Henry D. Sharpe, Jr., president, Brown & Sharpe Manufacturing Co., Providence, R. I.; Harold B. Smith, president, Illinois Tool Works, Chicago; Duncan J. Stewart, president, Barber-Colman Co., Rockford, Ill.; George Terborgh, research director, MAPI, Washington, D. C.; A. Leo West executive vice president, Clearing Machine Corp., Division of U. S. Industries Inc., Chicago, and Thomas H. West, president, Draper Corp., Hopedale, Mass.

Operating through the department of business and economics at IIT, the Center is housed in the Metallurgical and Chemical Engineering Building, 10 W. 33rd st.

Symposium Set

An International Symposium on the Physical Chemistry of Process Metallurgy has been announced by Dr. John Chipman, President-Elect of The Metallurgical Society of AIME and Professor of Metallurgy, Massachusetts Institute of Technology. This Symposium will be held Apr. 27-30, 1959, in Pittsburgh. It is being sponsored by The Metallurgical Society of AIME in cooperation with the Physical Chemistry of Steelmaking Committee of the Iron and Steel Division, the Physical Chemistry of Extractive Metallurgy Committee of the Extractive Metallurgy Division, and the Melting and Casting Committee of the Institute of Metals Division.

Patents in Pool Waiting to be Used

In Washington, The Office of Technical Service has a billion-dollar patent pool just waiting for businessmen to dip into, according to *Purchasing Week*. The pool is an outgrowth of World War II's government contracts for defense production. Out of these contracts with private business have come a whole raft of new products, and the patents are assigned to Uncle Sam. Mostly there is no charge, sometimes only a small royalty payment.

The true character of genius—without despising rules, it knows when and how to break them. —Channing

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Harrington Attends ICESS Meet

Western Society of Engineers participated in the meeting of the International Council of Engineering Societies Secretaries held in Cleveland on May 12, 13, and 14 through the representation of its Executive Secretary, J. Earl Harrington. Mr. Harrington, who was 1956 President of the Council, is keenly aware of the problems faced by the professional engineering societies today.

Representatives from these societies discussed administration, publications, development of meeting programs and the various other problems which enter into the operation of a professional society. The secretaries which comprise the Council represent a total membership of 800,000 working toward unity, both in the matter of operation and in objectives for the bettermen of the engineering profession.

At the Cleveland meeting officers for the 1958-59 year were elected. They included: Allan R. Putnam (A.S.T.E.), President; William H. Evans (Engineers' Society of Milwaukee), Vice-President; O. B. Shier, II (A.S.M.E.), Secretary; William P. Youngclaus, Jr. (American Society of Quality Control), Treasurer; Directors: Cohen C. Campbell (Society of Exploration Geophysicists, Tulsa, Oklahoma), Charles S. Doerr (Engineers' Club of Phildelphia), Kenneth F. Treschow (Engineers' Society of Western Pennsylvania, Pittsburgh), and L. Austin Wright (Engineering Institute of Canada), Immediate Past President.

Just in Time -- Paint for Your Lawn

The "miracle paint" industry, which has been full of surprises and new items lately, has now come up with the ultimate . . . a paint which keeps your lawn green!

Called "Lawn Tint," it's manufactured by National Chemical & Manufacturing Co., makers of Luminall Paints, and pioneers in the latex and emulsion paint industry. Lawn Tint is a green turf color concentrate which, on mixing with water and spraying, imparts a natural green color to brown grass.

For the homeowner, Lawn Tint gives promise of a uniform natural-looking lawn. Small areas damaged by insects or disease, or by the use of weed killers can be touched up to match the rest of the lawn. In dry parts of the country, late summer browning-off of the entire lawn can be face-lifted with a coating of green.

An extensive testing program over the last year has proved both the value and durability of Lawn Tint, the manufacturer says. Tests were run at the University of Florida on 16 different types of grasses, and in the Northern states on such grass as Kentucky Blue, creeping red fescue, bent, and Merion Blue. Favorable reports have resulted from tests by the United States Department of Agriculture, Dow Chemical Company, Iowa State University, Penn State University, Oklahoma State University, Texas A & M, New Mexico A & M, Kansas State College, the University of Colorado, the University of Massachusetts, and Purdue University.

In each case, tests have proved Lawn Tint to be durable and lasting, as well as harmless to growing grass, and without any ill effects on children or pets. In many cases, applications of Lawn Tint in the fall have lasted through the winter and into the spring growing season.

Small areas or spot applications can be made with an inexpensive hand sprayer or "pump-up" spray tank and gun. For larger areas, a power-operated boom-type sprayer is recommended. Lawn Tint should be applied when the grass is dry, although a small amount of dampness does not seem to interfere with its sticking qualities.

After spraying, Lawn Tint dries in as little as 15 minutes on a warm, sunny day. Once dry, the coating is tough and durable, and does not rub off or track. It does not damage shrubbery, trees, or bordering plants, but sidewalks and buildings should be protected against coloring by the spray.

Lawn Tint comes from the manufacturer as a concentrate, which is mixed with water for application. It may be diluted as much as 1 to 12. A gallon of concentrate will make spray to coat 1,000 to 3,000 square feet, depending on the condition of the lawn and the intensity of the green desired. And, although Lawn Tint beautifies lawns, normal care required of well-maintained lawns, including watering during dry periods, is still necessary.

For Summer Comfort

A high-grade suit manufacturer is experimenting with a chemical that will give a permanent crease to men's pants, reports *Textile World*. The effect is created by the local application of a chemical called ammonium thioglycolate, followed by pressing to set the crease.

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New Card System Announced

The Special Libraries Association Translation Center, located at the John Crerar Library in Chicago, has announced that it can now furnish, on a subscription basis, printed catalog cards for current scientific and technical material which has been translated into English from all languages, including Russian. The latest effort of the Center to facilitate the exchange and growth of scientific knowledge in the Western World will make available in easy-to-use, up-to-date card form the thousands of citations given in the Center's bibliographical journal, *Translation Monthly*. Four types of subscriptions to translation catalog cards are available:

1. Full coverage of *Translation Monthly* (approximately 12,000 titles yearly)
2. Coverage of all translations currently received by the Center (approximately 6,750 titles yearly)
3. Coverage of all Russian translations received by the Center (approximately 3,100 titles yearly)
4. Coverage of all titles in specific subject fields.

Special Libraries Association is an international organization of professional librarians and information experts who serve industry, business, scientific research, educational and technical institutions, government, newspapers and other organizations. Since 1909, the Association has promoted the collection, organization and dissemination of information in specialized fields and has published professional and bibliographical books and journals. The development of the Translation Center is one of its most recent and significant projects.

Partially supported by grants from the National Science Foundation and the National Institutes of Health, the SLA Translation Center is a depository for unpublished scientific material which has been translated into English from all languages. It actively solicits and collects translations from government agencies, industry, technical societies and educational institutions and makes copies of these translations available to other research groups and individuals. Users may borrow paper copies of desired translations or, thanks to the Center's excellent photoduplication facilities, may purchase for permanent retention microfilms or photoprints of translations. To keep libraries and information centers informed of new translations, the Center publishes *Translation Monthly*, a listing of translations recently received by the Center as well as translations available from commercial agencies.

Established in 1953

The SLA Translation Center was established at the John Crerar Library in October, 1953, and its size, scope and services have developed at a remarkable rate. A staff of four is now kept busy serving the scientific community by accumulating, cataloging and circulating translations and copies of translations.

In less than five years the original collectioin of 932 translations has increased to more than 20,000 items, and approximately 6,750 titles are being added annually. At the request of the National Science Foundation, the SLA Translation Center took over, in January, 1957, the Russian translations then housed in the Scientific Translations Center at the Library of Congress. This added 4,000 Russian items to the collection, and since then Russian material has been received regularly—about 3,000 titles a year—as have translations from all other languages.

Further information about the SLA Translation Center and its services may be obtained from: The SLA Translation Center, The John Crerar Library, 86 East Randolph Street, Chicago 1, Ill.

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DeLeuw, Cather To Study Tunnel

De Leuw, Cather & Company, Chicago consulting engineering firm, has been retained in connection with studies of the economic feasibility of a 40-mile tunnel across the English Channel. Associates in the study will be The Economist Intelligence Unit (a subsidiary of the *London Economist* newspaper), Societe d'Etudes Techniques et Economiques of France, and Walter P. Hedden, formerly Director of development of the Port of New York Authority.

Sponsor of the studies is the Groupement d'Etudes du Tunnel sous la Manche, composed of representatives of the Suez Canal Company, the French and British Channel Tunnel Companies, the International Road Federation (Paris Office), and Technical Studies, Inc. of New York. Preliminary engineering work on construction, ventilation, operation and other related problems will be done by the Delegate of the Groupement, with the assistance of special consultants.

Discussed since 1802, the location and nature of the tunnel is still not fixed. Decisions as to whether the tunnel will serve railway trains alone, or will also carry road vehicles, will be based on economic studies together with the outcome of efforts to develop a satisfactory ventilating system. Piggy-back service, carrying both automobiles and trucks on railroad flat cars, will also be considered.

While the Channel is only 22 miles wide at the narrowest point, which is between Dover and Calais, a longer portal-to-portal tunnel will be required.

One in every seven students in private correspondence schools is taking an accounting or business course.

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THE PROFESSIONAL DEVELOPMENT of SCIENTISTS and ENGINEERS

(Continued from Page 5)

I have always been interested in geology. Erosion by wind and water such as we see in the peneplane area of Southern Wisconsin has levelled off the area where formerly isolated peaks dominated the landscape. The vantage points of these peaks broadened the horizons of those who had the ability to climb them. I feel that engineering education should stress the cultivation of peaks and the advantages of such heights of knowledge represented by brilliant students, rather than permit them to be eroded through a mass stereotyped engineering program. Of course, these peaks need the peneplane of second level men to serve as bases, and our aim should always be to build the peaks higher.

The ideal situation in engineering education should, if possible, be based on the premise of holding students to the potential of capacity. I believe *no* effort should be made to accelerate the gifted student; such a program would lead to maladjustments of a social and personal nature. Rather than this, opportunity should be given to the more gifted student to keep him intellectually stretched.

In these days of mass production, streamlined manufacture and automation quality of material is being stressed, and the subject of quality control is a basic consideration in the use of materials. I feel that effort would be much worthwhile to increase the quality of personnel in the scientific and engineering fields as well as the quality of materials which are used in our scientific age.

I have referred to the necessity of giving full recognition to the education of the whole man. I would suggest that an interest be taken in educating good citizens with all that that name implies. These should include abilities to think effectively, communicate thought and be discriminative of values. These are the features of our education which should be developed as one advantage which we might have over Russia. We should be interested in educating the whole man and not merely in "crash" training.

One of the great deterrents to the development of scientific skills and the creative contributions of science is the throttling of the human spirit. It is possible to cultivate that freedom of outside pressures and influences in a democratic society, but to do so under communism would spell ruin for the system.

To summarize:

The important aspect of a professional man is an attitude of mind and what should be done to fortify it during the years of formal college education.

Ethics and the values which predominate in a profession are developed through a respect for, and the influence of, a teacher, and not by course content.

For effectiveness in a free society, we must become more interested in the quality of student and his opportunity to reach potential.

The varied experiences in the professional life of an engineer are illustrated in a cartoon on my desk. The engineer has taken off his engineering suit and is now putting on a Methods Man's apparel. Hanging in an open wardrobe are suits identified as Equipment Procurement, Design, Salesman, Public Relations and Diplomatic.

As an engineer, it would be well for me to don my diplomatic suit and close my remarks.

Operation 'Evolution' Called Successful

"Evolutionary Operation," described by Dr. George E. P. Box in 1957, has been used by the American Cyanamid Company for almost a year with "gratifying results," it was reported in Montreal, Quebec, at the Canada-United States Chemical Engineering Conference, sponsored by the American Institute of Chemical Engineers and the Chemical Institute of Canada.

Evolutionary Operation, explained Truman L. Koehler, of the Organic Chemical Division of American Cyanamid, emulates the natural process of variation and selection by providing that variation and selection be introduced to the manufacturing process. They are introduced "in such a way that there is little danger of producing unsatisfactory material, production is not disrupted and the normal plant personnel can continue to operate the plant on a routine basis. Evolutionary Operation is, therefore, a permanent method of plant operation not something applied on a short term basis. It works by gradually pushing the process toward its operating conditions. Since the method is permanent, only techniques which can be readily understood by the manufacturing personnel are used."

Evolutionary Operation was inaugurated at American Cyanamid in June,

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1957, with the help of Dr. Box and Dr. J. Stuart Hunter.

"Our experience with Evolutionary Operation," reported Koehler, "has been most gratifying. Unfortunately our program is still too immature to report the over-all economic gain. There is little doubt that it will be considerable. Perhaps it is equally important to point out that the concept of Evolutionary Operation is gradually being installed as a normal method of production. We feel quite confident that Evolutionary Operation will be increasingly expanded in our manufacturing area."

Rotating Seal Problem Is Partially Solved

The problem of developing a suitable rotating seal material for potential aircraft operations at high speeds and high temperatures has been partially solved after more than a year of research, according to the report submitted by Horizons Incorporated to Wright Air Development Center, Wright-Patterson Field, Dayton, Ohio.

While additional areas of research are suggested, the report states the hypothesis that wear is drastically influenced by the oxidation occurring on the rubbing surfaces. With the proper choice of materials, stable, complex oxides are formed which provide the correct solid lubricating film on each component and markedly lower the wear rate as the temperature is increased.

All materials were tested under conditions of no external lubrication, and the wear behavior of three basic types of metals were studied in detail. The first series was one of pure refractory hard metals. The second set of tests were of binary alloys using the refractory hard metals bonded with nickel. Ternary alloys of pure refractory hard metals bonded with nickel and infiltrated with silver were run in the third set of tests.

Of all materials tested, the finest results were obtained in the tests in which Kentanium K162B was run against the same metal at sliding speeds of 14,000 fpm in an ambient temperature of 1100° F.

Additions of silver and nickel were added to the hard refractory metals to determine whether these additives aided in the reduction of the wear rate. It was found that the nickel acts as a tough oxidation-resistant matrix. The silver, softening at the high temperatures, acts as a lubricant. The combination of the nickel and silver additives aids the shearing action between the mating surfaces and lowers the surface friction.

Superior wear qualities were observed in the tests of two ternary alloys which were prepared by powder metallurgy techniques and consisting of high percentages by weight of a refractory hard metal with the nickel and silver additions. These alloys were run against tool steel and inconel. The tests were conducted at sliding speeds of 30,000 fpm and ambient temperatures up to 1350° F. The hard refractory shells which provided the best results contained either tungsten boride or chromium nitride.

The tungsten boride alloy exhibited a constant wear rate at all temperatures against tool steel while the wear rate of the chromium nitride decreased at higher temperatures.

Working also with graphite seals, it was found that an unimpregnated graphite seal coated with an oxidation resistant layer of zirconium carbide showed improved wear properties over a regular graphite impregnated seal. These tests were run against stainless steel type 303 at sliding speeds of 14,000 fpm and at ambient temperatures of 1050° F.

Vitro Laboratories Gets U. S. Contract

Vitro Laboratories, a division of Vitro Corporation of America, has been awarded a contract by the U. S. Air Force Office of Scientific Research to investigate possible applications of the high intensity electric arc to ion propulsion, it was announced in West Orange, N. J.

The Vitro research program will be directed toward ion propulsion engine types with exhaust velocities between those obtained by high voltage acceleration of low current ion beams and those generated by chemical fuels.

Although similar in concept and appearance to the well known carbon arc, the high intensity electric arc is an unusual form of gaseous discharge which generates a plasma jet of electrode vapor characterized by high velocity and temperatures equal to those on the surface of the sun (about 7000° C).

At these temperatures all known materials are disintegrated and molecules are broken down into their constituent atoms, a considerable portion of which are ionized. It is this capability that may be harnessed as an ion source for propulsion.

Corrosion Scientists To Meet in Chicago

Corrosion scientists will gather in a nationwide meeting in Chicago next year to exchange information on how best to lessen the multi-billion dollar losses suffered by the economy because of corrosion. The meeting will be March 16-20, 1959 and will be the 15th Annual Conference and Exhibition of National Association of Corrosion Engineers.

Sixteen symposia have been arranged to discuss amelioration of corrosion in a wide variety of industries and occupations. Symposia will be held on: Aircraft Industry, Cathodic Protection, Chemical Industry, Corrosion Inhibitors, Corrosion Principles, Elevated

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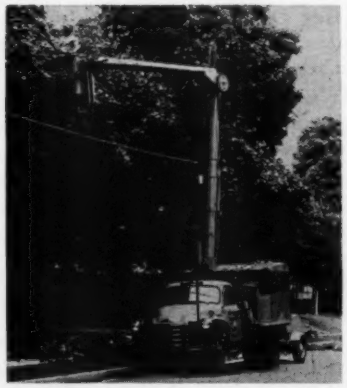

Temperatures, General Corrosion, High Purity Water, Marine, Oil and Gas Production, Paper Industry, Pipe Line General, Plastics, Protective Coatings, Refinery Industry, and Utilities Industry. In addition to these symposia, educational lectures will be presented.

Educated Guessers Work at Laboratory

Wanted: educated guessers with training as switchboard operators who can double as meter readers, draftsmen, and mathematicians. Experience necessary.

Almost any employment agency would discourage you if you tried to place such an ad. But in Chicago in Illinois Institute of Technology's A-C Network Analyzer laboratory, such men are at work all year around.

"When a power company wants to analyze what the estimated peak loads on transmission lines will be in 1965, a preliminary step is to try to foresee the expected consumption of electricity in that year," said Evrett B. Eggers, research engineer in Illinois Tech's electrical engineering department whose job is to guide power company teams in using the huge network analyzer.

This "educated guessing," plus data on the expected supply of power in 1965, is diagrammed for an entire generating system and fed into the analyzer.

High voltage transmission lines are represented by exactly proportional small voltage and currents flowing through accurately calibrated electrical impedances which can be safely manipulated, measured, and studied.

The apparatus, which completely covers three sides of a 30 x 20-foot room, is seven feet high and contains what appears to be the switchboard operators' nightmare—hundreds of plug lines interwoven into a seemingly impossible network of insulated wires.

Although it appears confusing, explained Eggers, the analyzer operators know exactly which units represent generators, transformers, and transmission lines.

A large power system sometimes takes as long as a day to set up on the analyzer, with analysis taking a week to two weeks. Possible combinations of power transmission are tried and, if found undesirable, rearranged to be analyzed again.

There are enough circuits to represent 18 generating stations, 136 transmission lines or transformers, 64 loads, and 36 variable ratio transformers.

The analyzer, purchased in 1944 by IIT and several cooperating power companies, is one of approximately 40 in the country. It is used by the companies with the guidance of Eggers and several electrical engineering graduate students, who are trained in its use through the electrical engineering power option curricullum at IIT.

One of three analyzers in the Chicago area, the Westinghouse-built apparatus is capable of containing any power system in miniature. Complex mathematical problems representing thousands of man-hours of work are done by the analyzer in minutes, helping to give power companies maximum use of their facilities and provide low-cost, efficient service.

The analyzer's miles of wiring and dozens of meters give the companies data which allows them to save money in additions, improvements, and adjustments.

The flashing red and amber lights and bright yellow and green tags don't always indicate that a survey of maximum-minimum power loads is being conducted, however. Short circuit surveys, disaster condition surveys, and the best methods of maintaining or restoring service also can be determined by the analyzer through the use of a "fault board" and recording table developed at IIT.

Private correspondence school enrollment has increased 4 percent within the past year. Over 6,000 business and industrial firms use home study courses to train their employees.

AICE and ASME Sponsor Conference

Fifty-three technical papers and a manufacturers' exhibit will be features of the Second Annual Heat Transfer Conference at the Edgewater Beach Hotel, Chicago, Aug. 18-20. The Conference is sponsored by the American Institute of Chemical Engineers and the American Society of Mechanical Engineers.

The exhibit, in which a score of manufacturers will participate, will show the latest in heat transfer equipment, media and ancilliaries.

The technical program, of which Alan S. Foust, A.I.Ch.E., and S. Kopp, A.S.M.E., are in charge, will be a comprehensive one with national authorities on heat transfer presenting advances in the field. A.S.M.E. has been active in the heat transfer field for many years. A.I.Ch.E. has held numerous symposiums and meetings on the subject and recently organized a Heat Transfer Division.

Culture Wins Out

A service station is hidden in an old palace in Brussels, reports *Petroleum Week*. When a petroleum company proposed to build a station nearby, the city's beautification committee imposed such strict zoning and artistic regulations that the project seemed impossible. But the company used the facade of the palace to shroud the station. Gasoline nozzles and air hose are concealed beneath trap doors in the sidewalk. Barely visible behind the wrought iron fence, is the dial face of a concealed pump.

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90th YE

President Marston (center) with Past Presidents Smith (left) and Boysen.

William R. Marston i new

Western Society of Engineers has entered its 90th year. The formal presentation of the newly elected Board of Direction for the 1958-59 year was made at the 89th Annual Dinner Meeting held at the Society Headquarters, 84 East Randolph Street on Tuesday, May 27.

The 90th WSE Board is headed by President William R. Marston, Deputy City Traffic Engineer for the City of Chicago; First Vice President Hjalmar W. Johnson, Vice President of Inland Steel Company; Second Vice President John T. Rettaliata, President of the Illinois Institute of Technology; and Treasurer Raymond D. Maxson, Consultant with the firm of Sargent & Lundy.

Special Awards Given at Dinner

The Annual Dinner Meeting also marked the presentation of awards to members of Western Society whose special services to the Society during the 1957-58 year were particularly noteworthy. Among those were: Howard A. Carter in "Repeat recognition of his work as Chairman of the Noon Luncheon Committee for 1957-58"; S. R. Price, Jr., "In recognition of his work as Chairman of the Special Events Committee for 1957-58"; William B. Salzman, "In recognition of his work as Chairman of the Young Engineers' Forum for 1957-58"; and Donald H. Worcester, "In recognition of his work as Chairman of the Excursion Committee for 1957-58."

Each year, Western Society of Engineers sponsors a Prize Paper contest at which time any member of WSE, regardless of grade of membership, may submit a paper of general interest for consideration. Cash awards of $50.00 each for papers submitted during the 1958 Prize Contest went to: A. J. Boulahanis for his paper titled "Mosquito Control in Illinois," H. L. Dalzell for his paper titled "Scientific Knowledge Unlimited," and to Donald A. Walsh for his paper titled "Overseas Employment for Engineers."

New WSE Life Members

Members of Western Society who received certificates of Life Membership, granted upon 30 years of continuous membership in good standing and the attaining of 65 years of age were: Charles E. Benson, J. Gardner Bennett, Frank B. Bills, E. T. Blix, J. M. Brandstetter, Leonard C. Childs, William S. Eldredge, Leonard C. Childs, J. H. Cougler, P. M. Grouner, N. P. Guynn, Eugene S. Hight, Frank H. Hunefeld, Clarence A. Jenks, Victor H. Julian, Richard A. Kreller, Adolph J. Luick, N. S. Mackie, Harold H. Morgan, J. Grant Morgan, F. A. Niestadt, Wesley W. Polk, Reginald Sandham, R. J. Strasser, and Carl A. Wittlinger.

President's Address

As his last official act during his tenure of office, outgoing President Ormas G. Smith presented the awards to those attending the Dinner. He then introduced Western Society's 90th President, William R. Marston. In his address, President Marston said:

"I started thinking seriously about what I might say tonight on the way back from Toronto, Saturday, where I had been attending a board meeting of another Professional Society. The thought struck me that I had just experienced a situation that typifies the dedication that many engineers have to their profession. Here were a group of eleven men willing to sacrafice several days including a weekend to attend to the affairs of their professional society.

Similar happenings go on daily in many societies. It happens in Western Society of Engineers. Many persons are so dedicated and the thought occurs to me that we may not all realize why.

How many of us have tried to answer the question "what can I get out of it" when trying to interest a prospective member? I daresay that we have all at one time or another listed for that per-

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ton is new President

Outgoing President Ormas G. Smith (left) at podium with President Marston.

son the many items of interest and personal gain he could expect to find through his membership. We tell him that he can meet others in his particular line, that he can meet and talk with men who have reached the top of their profession and that we provide a good atmosphere for social contacts. Everyone here tonight is here because they are truly interested in Western Society of Engineers. These same people are here on many other occasions too. There are many others not here that carry their share in many ways.

I believe that every active person in Western Society of Engineers is active because he has a desire to further his profession—not for any hope of personal gain.

The Founders of Western Society of Engineers had this in mind I am sure when almost 90 years ago they established the objectives of the societv. "The objects of this Society shall be the advancement of the theory and practice of engineering, the improvement of the status of engineering practice as a profession and the maintenance of high professional standards." I believe that they all had a sincere desire to improve their profession to the highest standards.

All of us that are so dedicated should become a salesman of professional patriotism. We need to tell these young engineers that there is no immediate reward for activity except the satisfaction of a job well done. They must understand that they are now reaping the reward of 90 years of other men's efforts and future generations will benefit by their activity today.

I further believe that we here have a further responsibility in that interest must be rekindled in our members who merely pay dues and feel that they are thus fulfiilling their obligation to their profession. I still recall the disappointment I felt when I was young in the Society and a member who had reached the age that I now confess to informed me that he had now reached the arm chair and slipper stage and had consequently given up any active participa-

At the dinner Mrs. Hjalmar W. Johnson (far left) and Mrs. A. P. Boysen, Mrs. E. A. Schmidt, Mrs. P. L. Coleman, and Mrs. Ormas G. Smith face Mrs J. P. Gnaedinger (center front) and Mrs. V. E. Gunlock, Mrs. Carl Metz, Mrs. G. L. Jackson, and Mrs. F. V. Smith across table. Their husbands are prominent WSE members.

tion in the affairs of the Society. How can anyone ever feel that he can in his lifetime pay his debt to the men who have furthered our engineering profession?

How can any of us feel that we can settle back in our arm chair until we know that our professions have reached the highest possible level? How can we ever be sure we have fulfilled our obligation to humanity? There are so many things yet to do—we must help in the advance of technical education—we must be certain that men representing our professions in industry and government are qualified—we must encourage young persons to learn about our professions so that we do not lose anyone who might be best fitted for our particular line—we must be prepared to advise on engineering in public improvements.

Our goals for this coming year are aimed toward increasing new membership and, just as important, toward securing greater participation of all members. Changes are in the offing that have been in development over several years which we hope will help us to achieve these aims.

There remains for me now to express my sincere gratitude for the opportunity you have given me to serve our engineering profession. I have served less years, and certainly to a lesser degree than many of you, and while I feel honored and pleased by your confidence in my ability to serve our Society, I have a deeper concern that I might fall short of your expectations.

You have my pledge that I will do everything possible to carry out my duties as your President, and I am sure that the Board and officers join in the sincere hope that next year at this time we can also look back and know that our Society has been further improved through our efforts. I wish also to thank all of these who will be serving in any capacity this coming year. Many of you will be asked to help us as committee chairmen and members and we know that if you can you will accept and stand with us in the further development of Western Society of Engineers."

Week-ends are the most dangerous time to be on U.S. highways. In 1957, more than 55 percent of all fatalities occurred on Fridays, Saturdays and Sundays.

To Discuss Insulation Systems

Practical problems dealing with every type of proven insulation system will be discussed at the First National Conference on the Application of Electrical Insulation, to be held at Cleveland on September 3-5, 1958. This is the first conference of this type to be held in the United States. The program for this conference was arranged during a meeting of the Conference Committee members at NEMA headquarters in New York City, under the direction of J. R. Perkins, of The DuPont Company, general chairman of the conference, and H. H. Chapman, Jr., of Owens-Corning-Fiberglas, program chairman.

Co-sponsors of the conference are the American Institute of Electrical Engineers (AIEE) and the National Electrical Manufacturers Association (NEMA).

The Mayor of Cleveland, Anthony J. Celebrezze, will welcome those attending the conference at one of the luncheons. Other luncheon speakers include W. V. O'Brien, vice-president and general manager, apparatus division, General Electric Company and president of NEMA, and L. F. Hickernell, vice-president in charge of engineering, Anaconda Wire & Cable Company and president of AIEE.

Two separate dinner meetings will be held on September 3. One, under the sponsorship of the AIEE Dielectrics Committee, will hear Dr. L. J. Berberich, of Westinghouse Electric Corporation, who was instrumental in the establishment of the committee and was also a leader in the movement to hold the Cleveland conference. K. N. Mathes, of General Electric, will be in charge of the dinner. The second dinner is in charge of A. S. Gray, executive vice-president of Insulation Manufacturers Corporation, a pioneer in the field of distribution of electrical insulating materials.

The organizing committee decided to hold concurrent sessions at Cleveland, with topics divided according to equipment category, as follows: rotating equipment, transformers, controls and instrumentation and electronics.

Under the direction of R. V. Lohse, of the Johns-Manville Corporation, a preprint booklet is being prepared for distribution to all those attending the conference. Many kinds of insulation, such as magnet and hook-up wire, varnishes, flexible insulation, mica combinations, laminates, liquid dielectrics will be discussed.

Each day the morning sessions will consist of papers delivered by representatives of electrical insulating manufacturers. In the afternoon sessions presentations will be made by electrical equipment manufacturers. Ample time is also reserved for open forum discussions.

An additional feature of the conference will be commercial and technical exhibits by the insulation and equipment manufacturers. Most of these will illustrate topic dealt with in the conference sessions. Exhibit hours are arranged so as to conflict as little as possible with the technical sessions.

In 1957 more students enrolled in private correspondence schools than in the freshman classes of all colleges and universities of the United States, according to figures just released by the National Home Study Council, Washington 5, D. C.

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ORIGINATORS OF DROP CROTCH AND LATERAL METHOD OF TRIMMING

Evans Talks on Missile Materials

As a result of "inauguration of the planet-hopping age, greater emphasis must be placed on the development of electrical materials" that are thermally stable and able to stand high temperatures, the Summer General Meeting of the American Institute of Electrical Engineers was told June 25 in Buffalo, N. Y.

This was emphasized by R. N. Evans of the Air Research & Development Command, Wright Patterson Air Force Base, Ohio, in a paper, High Temperature Electrical Insulation Materials for Missiles. The paper reviewed Wright Air Development Center's program for the development of high temperature insulation.

The program, he said, is centered primarily around the development of thermally stable insulating materials for astronautic flight, where under certain flight conditions temperatures above 2000° F. are foreseen.

"At a lower speed of Mach 3, at 50,000 feet altitude, the equilibrium skin temperature due to aerodynamic heating is approximately 500° F.," he said. "However, in addition to the temperature requirement imposed by high speed flight, numerous other environmental factors must be considered. These may be listed as thermal shock, sonic vibration, nuclear radiation, cosmic radiation, meteoric dust, high altitude corona effects, ozone, ions and atoms.

"At 60 miles altitude, the oxygen molecules have dissociated to such an extent that both molecular and atomic oxygen are present in equal concentration. The 'out-gassing' of commercially available electrical insulation materials under low pressures (200,000 feet altitude or 2mm absolute pressure) especially under conditions where elevated temperatures provide an assist, the insulation deteriorate and electric breakdown and arcing may result. For most insulators, exposure to nuclear radiation brings about permanent changes in molecular structure, new bonds of a chemical nature are formed, the specimen progressively increases in brittleness and in general the mechanical properties, such as flexibility, deteriorate. The inorganic insulation materials stand up best—materials such as ceramics, mica and glass."

Commercially available electrical materials that meet required high temperature environment include alumina microspheres, reconstructed phlogopite mica, glass braid ceramic, magnesia, boron nitride and alumina, proceram and alumina, resin-glass fabric laminates and fotoceram, teflor-regular, teflon 100-X and silicone, tin dioxide plus and antimony oxide.

Emerson Gets AEC Lump Sum Contract

The Atomic Energy Commission has entered into a lump-sum contract with the Emerson Radio and Phonograph Corporation of Jersey City, N. J., acting for the "CEM Group," for a technical and management study of industrial applications of high-level radiation, it was announced on June 18 in Washington, D. C. The contract amount is $86,847.

The CEM (chemicals, electronics, metallurgy) group is composed of the Emerson Radio and Phonograph Corporation, General Aniline and Film Corporation of New York, and Revere Copper and Brass Incorporated of New York. The proposal made on behalf of the group was one of 23 submitted in response to an invitation by the Commission in March (Announcement No. A-44, March 5, 1958) for proposals which would serve as the basis for negotiation of a contract.

The CEM study is an initial effort by the Commission to survey means of, and expected benefits from, an acceleration of the development of economic high-level radiation for industrial processing. Details concerning the scope of the study, which is expected to be completed in about 10 months, were given in the March 5 announcement. Included are a survey of world technology on current and foreseen uses of high-level sources of gamma radiation; a survey of U. S. industry's current and planned uses, on a commercial scale, of large gamma irradiators; and a comparison of the technical, economic, and management advantages and problems associated with potential applications of high-level radiation with advantages and problems of other energy sources or chemical agents which may be competitive.

The contract with Emerson Radio and Phonograph Corporation will be administered by the Commission's Office of Industrial Development. The work of the contractor will be under the direction of Rear Admiral John D. Small (Ret.), Vice-President of Emerson.

In addition to the Emerson proposal on behalf of the CEM Group, it is understood that proposals were also submitted by the following:

Armour Research Foundation; Astra, Inc.; Battelle Memorial Institute; Bendix Systems Division, Bendix Aviation Corporation; Booz-Allen Applied Research, Inc.; Combustion Engineering, Inc.; Cook Electric Company; George T. Dib, Consultant; Calaxy, Inc.; General Electric Company; Grace Research and Development Division, W. R. Grace & Company; Monsanto Chemical Company; National Lead Company; Nuclear Systems Division, Budd Company; Quantum, Inc.; Southwest Research Institute; Stanford Research Institute; Technical Operations, Inc.; Technical Research Group, Inc.; Tracerlab, Inc.; United States Rubber Company; and Vitro Corporation of America.

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New Products

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Slump Cone

Slump tests on concrete can now be performed more efficiently with a new seamless Slump Cone designed and manufactured by Soiltest Inc.

The new seamless Slump Cone is made of heavy gauge cadmium plated sheet steel and is of a one piece construction. The handles and foot clamps are welded in position and are also cadmium plated to resist rust.

The seamless Slump Cone is made in form of a fustrum of a cone with an 8" diameter open base and a 4" diameter open top. Height is 12".

Slump cones are used for measuring the slump of Portland Cement Concrete in accordance with American Society for Testing Materials Specifications C-39, C-143, C-192 and American Association of State Highway Officials designations T-22, T-119 and T-126.

For additional information, write to *Midwest Engineer*, Key 601.

Caster

A new and radically different caster, the 3100 series, designed by The Rapids-Standard Co., Inc. of Grand Rapids, Mich., makers of the Rapistan line of conveyors, casters and wheels, has eliminated the conventional king-pin. The pin, usually the first thing to fail on a caster, has been replaced by a unique single ball raceway that preforms multiple functions.

The new raceway first joins the top plate to the yoke (formerly the king-pin's function), and secondly it acts as the load thrust bearing.

The new "king-pinless" bearing achieves a marked increase in caster life expectancy and easier swiveling under industrial load conditions, according to Rapistan officials.

Ordinary bearings, employing a king-pin, concentrate load forces on only a few balls at the rear of the bearing, while the front section carries very little. Thus the caster must swivel on the rear balls, resulting in metal-against-metal sliding friction, making swiveling action difficult as loads are increased.

The new caster is unusual in its simplicity of design. At a time when most industrial products are being made more complex, this one has been greatly simplified. Yet performance characteristics have been improved by the very changes simplifying its construction.

The result has been development of a new concept in caster engineering, combining advantages of double ball race construction and the economy of single ball race-way casters.

The simplified design of the new 3100 series requires fewer parts than conventional casters, thus permitting simplified assembly procedures. It has fewer parts to wear out. Both load and thrust forces are evenly distributed over the entire ball bearing race way, eliminating "king-pin" binding and sliding friction to keep swivel action free and easy.

Race-ways of the new 3100 series are cold formed, with curved bearing surfaces conforming to the contour of the balls. These race-ways are fully hardened to prevent ball indentation under heavy and shock loading conditions.

The new 3100 series is designed for all general-purpose applications in industry — stores, warehouses, institutions, manufacturing, etc. Its capacity ranges up to 500 pounds per caster.

According to Rapids-Standard, the new 3100 series caster is available in six models to accommodate six different wheel sizes ranging from 2½" to 6" diameters. Available wheel materials include soft and hard tread solid rubber and nicro steel. Wheels are supplied with oilite, roller, or plain bearings.

For complete information regarding the new 3100 series, write *Midwest Engineer*, Key 602.

Solenoid Valve

New three-way solenoid-operated valve now manufactured for air-craft and missiles is believed to be smallest available, according to the manufacturer, Bridgeport Thermostat Division, Robertshaw-Fulton Controls Company.

Containing the exclusive captive seal, the valve measures 3.4"x2.07"x2.095", and weighs only .77 lbs. It is capable of handling pressures in excess of 3,000 psi.

The ¼" valve is suitable for use with various gases, and liquids including fuels and oils, as well as certain corrosive materials in a temperature range beyond 350° F. A number of rocket and jet power plant manufacturers have already completed extensive field and evaluation tests.

Many advantages offered by the valve result from its use of a unique variation of the conventional O-ring seal. The new seal device, called a "captive seal," is arranged to float between the valve seat and poppet in such a way as to maintain a perfect balance, regardless of pressure.

Additional details about the new aircraft valve model 65M44 is available by writing *Midwest Engineer*, Key 603.

Relays

A new series of high-speed polarized relays, "Diamond H" Series P Relays, has been developed and is being marketed by The Hart Manufacturing Company.

Engineered to provide extremely fast action with freedom from bounce, together with high sensitivity and excellent stability, this new series of relays gives

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consistent performance with low distortion. Under some conditions they will handle over 1,000 pulses per second.

SPDT, with two independent coils, they are available with various coil resistances up to 5,000 ohms each coil. Contact ratings vary with the switching speed desired but range from 60 milliamperes to 2 amperes with voltages to 120 A. C. or D. C.

Small in size and ruggedly built, they are designed for use in a wide variety of electronic applications as well as in communications equipment.

For further information, write *Midwest Engineer*, Key 604.

Portable X-ray

The lightest, highest voltage and least expensive per kvp portable X-ray unit available today for field and plant radiography are the claims made for the new General Electric LX-140.

The new LX-140 offers effective radiation protection, unitized design, simplified controls, dust and moisture proof head, in addition to being the lightest portable unit with the highest voltage per pound.

Designed to resist the roughest of handling expected of an x-ray unit of this type, the new LX-140 offers a continuous range from 70 to 140 kvp. Radiographs with 2% sensitivity and 1.5 density can be produced with a 1½ minute exposure through 1¼" of steel, according to General Electric.

Simplified controls of the LX-140 enable even the most inexperienced personnel to learn its operation with a few minutes of instruction, it is claimed.

The LX-140 is said to be the only portable x-ray unit that can be repaired right in the field by the owner. Gas insulation removes many of the contamination problems usually encountered with oil insulation type units.

The LX-140 has been specifically designed for ease of handling and for maximum durability. Featuring unitized design, the LX-140 is supplied with a durable plastic case with cushioned interior for safe shipping and handling without special packing.

The LX-140 operates from 115 v, 60 cycle line with ± 10% allowable variation. The new unit will operate in temperatures from 0 to 120 F., humidity up to 95% and altitudes to 5000 feet.

The tube is hot-cathode, hooded-anode type, fixed at 2ma ± 10% for all kvp settings. It is enclosed with high voltage and filament transformers in tank insulated by sulfahexafluoride gas at approximately 5 psi nominal and 7.5 psi maximum.

Effective projected focal spot is approximately 1.5mm in the longest direction. The useful radiation field is approximately 7" in diameter at 9" f.f.d. Equivalent inherent filtration approximately 3mm at 70 kvp.

A beam-defining cone snaps onto the tube head and automatically provides 9" f.f.d. when positioned against inch-thick plate.

Exposure timer provides a 5-minute range in 5-second graduations. Voltage technic selector is of the variable autotransformer type, with 70-140 kvp settings. Provided with output and voltage compensating knobs. A reference meter indicates current of 2 ma ± 5% when dial remains in the red line area.

Weights: Tube head with guard frame, 46½ lbs.; tube head control 25 lbs.; case 40 lbs.

Dimensions: Tube head, 20" L, 7¼" W, 3" H; tube head control, 13½" L, 10" W, 9½" H, carrying case 26" L, 24" W, and 18" H.

Step-down transformer available to permit operation from 240/440 lines.

The LX-140 is manufactured by the X-Ray Department, General Electric Company, Milwaukee, Wisconsin.

Pressure Switch

An extremely small, lightweight pressure switch, called a pressure capswitch, is being offered by Bridgeport Thermostat Division, Robertshaw-Fulton Controls Company, for applications in aircraft, missiles and industrial miniaturization programs.

Compact in design, the new pressure capswitch, model 65M92, can be mounted on 1.09" centers. It is used to control, indicate and monitor the line pressure of such materials as gases, hydraulic oil and fuels.

The device already has undergone extensive tests, indicating dependable pressures from 20 psi to 500 psi (other models available with trip pressure through 3,000 psi); immunity to ambient temperatures from—65°F to 250°F; repeatability over 20,000 cycles; trip and a bursting strength of 4,000 psi.

According to the company, it is being used now in production models of a liquid fuel rocket engine.

Different from conventional pressure switches which employ diaphragms to transfer the actuating pressure, the new model 65M92 contains a piston actuator operating through an o-ring seal. This arrangement renders the mechanism virtually insensitive to vibration fatigue and rapid temperature cycling.

It also permits the handling of any actuating fluid that has a compatible elastomeric compound. These include, for example: air, combustion gases, JP's, MIL-0-5606, hydrogen peroxide, and others.

The precision subminiature switch used in the device is factory set and cast in epoxy resins. The model 65M92 is equipped with a glass sealed connector and has single pole, double throw electrical arrangement.

Additional information about the new pressure capswitch model 65M92 is available by writing *Midwest Engineer*, Key 605.

A sound mind in a sound body is a short but full description of a happy state in this world. —Locke

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POSITIONS AVAILABLE

C-6502 SALES ENGR. Grad. Mech. or Metallurgical age to 35; up to 3 yrs. exper. Duties: Recent engrg. grads. for training. Program will incl. exposure to products & their application by contact with headquarters sales office oper. research & devel. activities & mfg. facilities for a period of approx. one year. At conclusion of training, will be assigned to territory as Sales Engr. sal. to $500 loc. Calumet Area, employer will pay the fee.

C-6826 ESTIMATOR Grad. CE 3+ yrs. exper. estimating for contractor. Duties: Estimating & quantity take off on heavy construction such as waterworks, power house, bridges, etc. for a general contractor sal. $700+ dep. on exper. loc. Chgo. employer will pay the fee.

C-6830 STRUCTURAL DESIGNER Grad. CE or Struct. age to 35; 3+ yrs. exper. in steel & reinforced concrete design. Duties: Design & draft. struct. on industrial bldgs. abt. 50% board work sal. abt. $4.00 hr. loc. Chgo. employer will pay the fee.

C-6854A SALES ENGRS. Must have proven sales record in utility field. Duties: Reporting to Gen'l. Sales Mgr. Elect. Apparatus Div. Will promote & sell elect. apparatus to elect. utilities & indust. accounts. Aid in customer application of products, service eqpt. in field when necessary, present elect. apparatus to the utility standard committee & obtain their approval. Represent elect. apparatus div. at tech. meetings in territory, travel—car furn. for mfr. sal. $7800-12,000, Territory N.Y., Chgo., Atlanta, Cleveland or any large city where applicant has a following, employer will pay the fee.

C-6875A PROJECT ENGR. Grad. Mech. 10+ yrs. in oven design, application or mgr. Duties: To take full charge of engrg. dept. & develop a competent staff for mfrer of industrial ovens & furnaces sal. abt. $10,000 loc. Chgo. employer will pay the fee.

C-6901 STRUCT. DESIGN ENGR. Grad. 3+ yrs. in designing structural supports. Duties: To work as structural engr. in mech. engrg. dept. designing structural supports for antennas sal. abt. $8400 loc. S.W. Chgo. suburb, employer will pay the fee.

C-6905 HYDRAULIC ENGR. Grad. Civil Engr. age 30-40; with 5 or more yrs. exper. in hydraulic engrg. Duties: involve preparation of technical literature promoting the use of concrete in dams, flood control structures, culverts & allied fields. Will contact state & federal agencies. Salary open. Employer will pay placement fee. Hdqrs. Chgo, with some travel.

C-6906 FIELD LUBRICATION ENGR. Mech. or other tech. training, age abt. 35; 2+ yrs. in editorial, sales or application, knowl. of automotive eqpt. & lubricants desired. Duties: To contact mfrers. of automotive eqpt., prepare lubrication charts, bulletin for service eqpt. Good personality to check with mfrers. & review charts & make revisions necessary sal. abt. $7500 loc. Chgo.

C-6910 ASST. PRODUCT SALES ENGR. Grad. ME age to 32; Duties: To assist product sales manager in sale of air control valves, must be aggressive & have good sales personality for a mfrer. sal. abt. $600 loc. N.W. Chgo. suburb, employer will pay the fee.

C-6919 PLANT METALLURGIST Met. Eng. Degree age 26-32; 2 yrs. exper. pref. in steel mfg., processing or testing. Duties: Investigate product both to develop mfg. procedures & customer problems. Must have completed training. Personality suitable for both outside & inside work sal. depends on background So. Chgo. Suburb, employer will negotiate the fee.

ENGINEERS AVAILABLE

898-MW: MANAGEMENT ENGR. (HEAT TRANSFER) 29 BSME, MBA (management option) exper. in technical, administrative & sales aspects of engrg. 2 yrs. exper. as engr. & sales manager heat exchanger division heat transfer company. 2 yrs. design & liaison group leader missile research company. 2 yrs. engine & vehicle testing, Midwest. East.

897-MW: SALES ENGR. (machinery & process eqpt.) 32 BSME; Good background direct sales, advertising & mach. layout of heavy eqpt. & capital goods. Prefer basic industry & OEM. Salary & commission. Persistent & responsible. Details available, prefer Wis.

895-MW: DEVELOPMENT ENGR. 40 BS Degree; 15 yrs. applied research & product development Mechanical & Electro Mechanical devices. Possess intellectual curiosity combined with background of practical exper. Acquainted with related problems of design, sales, mfr. $7800 West & Southwest.

889-MW: MECHANICAL ENGRG. RESEARCH & DEVELOPMENT 47 BSME 25 yrs. exper. in this field with emphasis on product devel. & research in automotive industry. Individual & group contribution, developing into managerial status. Desire resp. staff engrg. position.

Waukegan Men Study High Heat

This summer when most area residents will be thinking about keeping cool, a group of men at American Steel and Wire Waukegan Works, a division of U. S. Steel at Waukegan, Ill., will be vitally concerned over the problem of producing heat . . . the kind of heat that's measured in hundreds of degrees.

The heat makers are five new spheroidizing bell-type furnaces, each capable of producing 1,650 degree heat for the annealing of wire at the local American Steel and Wire plant. Final installation and testing procedures are now underway with July 1 set as the target date for beginning of complete operation.

The five new units, according to Vernon L. Strohm, general superintendent of the plant, will increase spheroidizing capacity by 75 per cent. Strohm said the furnaces and the new addition in which they are housed are an expression of U. S. Steel's confidence in the continued growth of the wire industry and its future in the Waukegan area.

Construction of the new facilities was begun last July. The addition of the five new units will bring to 22 the total number of this type of furnace in operation at Waukegan Works.

Spheroidizing or annealing, is the heat treatment used to prepare hard drawn steel wire or rods for further reduction and shaping into a satisfactory end product for eventual consumer use.

The new units are 108 inches high and measure 114 inches across the base. They are fired by natural gas and have a heat range of 750 to 1,650 degrees Fahrenheit. The furnaces, all American Gas Association approved, are being constructed by the Lee Wilson Engineering Company of Cleveland, Ohio.

In the center of each furnace base there is a specially installed propeller-like blade which revolves 1,750 times a minute. Its function is to evenly circulate gases within the furnace. A mixture of 85 per cent nitrogen and 15 per cent hydrogen is used within the furnaces after all oxygen has been removed.

Ten bases were constructed for use with the five furnaces. Doubling the number of bases will mean more efficient utilization of heat and will cut the time needed for each cycle, according to Strohm.

The ten base five furnace ratio is also the reason for an interesting related operation in the new spheroidizing addition. It's an example of moving the mountain to Mohammed. The normal procedure would appear to be the moving of the wire to the furnaces, but instead, it's the furnaces making the move.

A huge overhead crane lifts each furnace, still hot, high into the air and moves it down and over an adjacent base already loaded with wire coils, thus providing one of the more spectacular operations connected with the new installation.

To Study Corrosion Resistant Metals

In furtherance of the cooperative effort of concerned professional bodies in the development of information on corrosion-resistant metals, the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) has announced that a Conference on the Physical Metallurgy of Stress-Corrosion Fracture will be held April 2-3, 1959, at the Mellon Institute, Pittsburgh.

The meeting will be sponsored by the Corrosion-Resistant Metals Committee of the Institute of Metals Division of The Metallurgical Society, a constituent organization of AIME, and the Pittsburgh Section of AIME. Cooperating with The Metallurgical Society of AIME in the technical program will be the Electrochemical Society, The National Association of Corrosion Engineers, and the American Society of Testing Materials.

The program is intended to provide a broad basis for presentation and discussion of recent fundamental advances in stress-corrosion cracking. The sessions will center around these general subjects:

Theoretical aspects of stress corrosion and fracture; new experimental advance in stress corrosion and fracture; mechanisms of stress-corrosion cracking, including environmental and metallurgical aspects and the behavior of specific materials. Emphasis will be placed on the physical metallurgical, surface-chemical, and solid state physics aspects of the phenomena.

On April 2, the sessions, as presently planned, will take up:

Introduction and Background: (1) significance of the stress-corrosion problem; (2) characteristics of stress-corrosion cracking.

Theoretical Aspects of Stress, Corrosion, and Fracture: (1) relationship of microstress to fracture (at or near solid-fuel interfaces); (2) thermodynamic relationship between stress and chemical potential; relationship of surface topology and structure to environment.

Experimental Aspects of Stress, Corrosion, and Fracture: (1) role of the corrosion product; (2) stress and microtopology; stress; and (3) electrode potential.

On April 3 the subject, Mechanisms of Stress-Corrosion Cracking, will include: (1) environmental aspects; (2) metallurgical aspects; and (3) behavior of specific materials.

The sessions will be of the discussion type. Speakers will present summaries of their papers, which are to be preprinted and circulated in advance, thus providing that most of the time of the Conference may be devoted to discussion and exchange of scientific information.

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Reviews of Technical Books

Engineering Economy

Engineering Economy, by Clarence E. Bullinger, McGraw-Hill Book Company, New York 36, N.Y. Third edition, 1958. Pages, 379. Price, $7.00.

This book provides an understanding of the type of economic study which engineers in industry are called upon to make when considering the functional solution of engineering problems. *Engineering Economy* consists of three separate but related analyses—(1), the economy analysis, (2), the intangible analysis, and (3), the financial analysis. The economy analysis attempts to evaluate the worth-whileness of the project in terms of profit and yield on the investment, the intangible is concerned with those factors which are influenced by human judgment, while the financial deals with the provision of the funds which make the project possible.

Bullinger describes the different stages of thinking in a straightforward fashion from the time an idea is proposed as a project until it has gone through the development and design phases, to the design of the factory to produce it, and then the operation of the factory.

In this edition all cost data have been brought up to date. A new discussion of decision-making has been added. New operations research procedures for the solution of problems have been introduced; particularly the concept of the development of "models" and "criteria." Using the simple "profit-and-loss" statement in business as a model, Bullinger shows how other traditional models in engineering economy have been derived and makes some indication of their relative advantages and disadvantages. The effect of Federal and State income taxes on engineering projects is introduced for the first time in this edition. The approach to this problem is simplified and generalized so that the reader can substitute the particular tax law for any particular year. Illustrative materials have been revised to bring cost values more nearly in line with current values. All the problems have also been revised.

Bullinger is professor of Industrial Engineering, Iowa State College.

Estimating Construction Costs

Estimating Construction Costs, by R. L. Peurifoy. McGraw-Hill Book Company, New York 36, N. Y. Second edition, 1958. Pages, 446. Price, $10.75.

A clearly written, practical volume for construction engineers, civil engineers, contractors, and architects, this book tells in detail how to estimate construction costs of all kinds and describes the various methods of preparing such estimates.

The author breaks costs down into material, labor, equipment, overhead, profit. Then, with many examples, he explains how to arrive at costs of materials, equipment, and labor for a great variety of projects: earthwork, foundations, highways, concrete, floor systems, masonry, timber structures, steel structures, utility systems, and more. The book shows exactly how to determine production rates of both labor and equipment. Costs of many types of construction equipment are given, as well as the hourly cost of owning and operating such equipment.

This revised and expanded edition gives up-to-date coverage of workmen's compensation insurance, together with other types of applicable insurance, performance bonds, costs of overhead and profit. The book describes factors influencing the cost of these items, and give amounts to use when estimating a project.

New material has been added on the building trades, including coverage of stone masonry, glass and glazing, painting, lathing and plastering, roofing and sheet metal, plumbing and electrical work. Revised production rate tables give verified ranges instead of fixed rates to enable the user to select the rates which apply to a given project and conditions.

Well-documented, with numerous problems, illustrative examples, and over 100 tables of production rates, *Estimating Construction Costs* is an outstanding book in its field, invaluable as a handbook. It contains a wealth of information on all phases of construction-cost estimating not found elsewhere.

R. L. Peurifoy has taught at the University of Texas and Texas College of Arts and Industries, and is presently professor of Construction Engineering at Texas A. & M. For 12 years a consulting engineer, he is also a member of the construction committee of the A.S.E.E. and is director of the Texas Section of the A.S.C.E.

Impedance Matching

Impedance Matching, edited by Alexander Schure, John F. Rider Publisher, Inc., New York 11, N.Y. First edition, 1958. Price, $2.90.

This is volume 23 of the Rider Electronics Technology Series. It is the first comprehensive source book for information on impedance matching. This book provides detailed information on how to obtain maximum power transfer between any type of generator and load. Impedance matching devices, power transformers, impedance matching at audio frequencies and at radio frequencies, etc., are just a few of the areas covered. For example, discussion of the various resistive components of electrical and electronic circuits includes impedance matching in transistor circuits. This book is heavily illustrated and includes numerous examples which further help to simplify the subject. Anyone concerned will find it an outstanding, informative work deserving a place in his technical library.

Computer to Regulate C. E. Power

A computer device that will measure the moment-to-moment use of electricity by the 1,940,000 customers in the Chicago area—and simultaneously regulate the output of dozens of generators to meet the exact demand—is to be installed by Commonwealth Edison Company.

Willis Gale, chairman of the utility, announced that an order has been placed with General Electric Company for the principal components of the installation. Approximately two years will be required to complete the project.

The installation will be among the first in the country combining the complete computer and generation control elements.

The device will economically distribute production among the 12 Edison generating stations which in 1957 turned out nearly 20 billion kilowatt-hours of electricity.

At the same time it coordinates total output to meet total demand, it will also determine which of the generators then in operation best fit the dollars and cents economics of production.

It will not only determine this; it will, by remote control, step up or lower the output of the individual machines.

For example, when additional power is needed on a particular part of the system, the device will determine which generator can turn out the extra electricity at the lowest delivered cost. Conversely, if less is required it will determine, on a cost basis, which machine should reduce output.

It will then send out signals to the control mechanism of the turbine generator selected and automatically regulate its output. That generator may be in a station in Chicago, Waukegan, Joliet or elsewhere on the system.

The device will be valuable also in helping to maintain the scheduled interchange of power between Edison and other utilities with which it is interconnected. It will be able to do this because of its ability to carry the amount of generation in Edison stations to meet moment-to-moment load fluctuations on Edison's own system.

This factor is important because Edison is part of a large power pool in the east central part of the United States. Smooth operation of the pool requires that each of the interconnected utilities be responsible for generating the power to meet its own load requirements.

Power output of the 55 turbine generating units at the 12 Commonwealth Edison stations is now coordinated from a Control Room located in the Edison Building at 72 West Adams Street. Here, 24 hours a day, load dispatchers direct output to meet the collective demand of the system's customers. The new computer will be installed at these headquarters to help the load dispatchers balance supply and demand more precisely and more efficiently.

The customer demand, or "load," as it is called, is continually changing. It may be twice as high at two o'clock in the afternoon as it is at two in the morning. Saturday has its own pattern and so does a Sunday or a holiday.

Weather is a very important factor. Extreme heat in the summer or extreme cold in the winter increases demand. More lights are on when it's cloudy than on a bright day.

The noon-hour brings a big drop in use as workers stop for lunch. Even the morning coffee break can be identified on the load charts.

Christmas lights cause their variations as do major sporting events like a world series attracting extra television watchers.

No minute of the day or night is precisely like the minute before.

The Company knows the cost at which each machine produces electricity. Several factors are involved in this determination: the amount of fuel required; the cost of transporting the fuel to the station involved; the transmission cost of getting the electricity from the point of generation to the point where it is used.

This information, constantly revised to meet changing conditions, will be fed into the computer in advance. The device, with its ability to make intricate calculations, almost instantaneously will translate its "knowledge" into the correct answer.

Rettaliata Speaks To YMCA Group

Science is compelling men to think in terms of the whole of mankind.

Dr. John T. Rettaliata, MWSE, president of Illinois Institute of Technology, voiced this opinion on May 5 at the Eighth Annual Youth Citizenship luncheon of the YMCA of Metropolitan Chicago in the Palmer House.

Speaking on "Citizenship Responsibilities—An Adult's Point of View," the engineering educator addressed civic, business, and industrial leaders as well as young men and women participating in the Y's citizenship educational program.

"Scientific advances have placed a great power in the hands of man," he said.

"That power must be used wisely to make the world a better place in which to live. This is the responsibility which you young men and women, and others throughout the land, must prepare to accept as adult citizens.

"In my opinion, World War III will never happen," Rettaliata said. "The certainty of retaliatory annihilation of an aggressor nation will be the deterrent to any global conflict. We may still witness limited skirmishes between nations but nothing of great magnitude.

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As I see it, no nation will ever use the hydrogen bomb against an enemy."

Urging the young people to continue their formal education beyond high school, he pointed out that the well-educated person "is better equipped to cope with the problems of life in any field of activity, whether it be in business or industry, the professions or the arts, in social service, or in politics where there is need of capable people, possessing broad vision, to improve the quality of government."

He also pointed out that, over a lifetime, the average college graduate will earn over $100,000 more than his high school classmates who did not continue education beyond the 12th grade.

Factors providing opportunities for acquiring advanced education were cited by Rettaliata as:

—A steadily increasing number of scholarships.

—The shortened work week providing greater opportunity to continue studies in evening classes while working at full-time jobs.

—Evening and extension courses conducted by colleges and universities.

"Our social and economic orders are becoming more complex," he said, "and advances in science and technology are bringing changes that affect the lives of all of the people.

"More and more, corporation executives and others must be informed on many aspects of our economy as a basis for sound decisions."

The scientist or engineer must be informed in other areas embracing literature, history, economics, political science and other subjects relating to the liberal arts field, he added. It is equally important that students educated in liberal arts programs understand the contributions and problems of science and technology.

Rettaliata also pointed out that, for the first time in history, science and technology are bringing abundance for all within reach of attainment.

"And in doing so," he said, "they have done more to lessen class hatred and class envy, and to remove class distinctions, than all the labors of the socialist dreamers.

"It has always seemed to me that socialism consists essentially of a leveling down process. America is showing the world how all men may be leveled up."

News of Engineers

Walter C. Kottemann, MWSE, expense analysis engineer for Illinois Bell Telephone Company, has been awarded a Sloan Fellowship for one year of advanced study at Massachusetts Institute of Technology's School of Industrial Management.

Kottemann entered the Institute in June for detailed study of sound management action.

"Fellowship candidates are selected by their companies for having demonstrated executive ability and marked promise for growth," according to Professor Howard W. Johnson, director of the Sloan program. The program is made possible by grants of the Alfred P. Sloan Foundation.

Kottemann joined Illinois Bell in 1948. He has a BS degree in electrical engineering with honors from the University of Illinois and a year of post graduate study at Illinois Institute of Technology.

* * *

A new undergraduate scholarship, honoring the first dean of the Northwestern University Technological Institute, will be awarded for the first time this fall, according to Dean Harold B. Gotaas.

The new scholarship, named in memory of **Dean David Ovid W. Eshbach,** a former president of WSE, who died last March 4, is being made possible by contributions to the Eshbach Memorial Fund by his associates, students, and alumni of the Institute.

He was dean of the Technological Institute from 1939 to 1953 and continued active in teaching engineering until his death. The awards will be made on the basis of need, scholarship, and indicated leadership ability in the engineering profession.

* * *

The appointment of P. E. Fedeles as sales engineer for the metalworking industry in Western Michigan has been announced by Latrobe Steel Company in Latrobe, Pa.

Latrobe is one of the world's largest tool steel manufacturers and a major producer also of special alloys including stainless steel.

Fedeles, a native of Monaca, Pa., will make his home and headquarters in Grand Rapids. He and his wife and two children will soon make the move from Latrobe, where he has been at the company's headquarters for the past several years.

Fedeles, who attended Lehigh University, has been a metallurgical engineer in the Standards and Inspection Department at Latrobe Steel, as well as a metallurgical engineer in the Sales-Service Department.

* * *

Ted Van Zelst, MWSE, president of Soiltest, Inc., spoke recently before student groups at the University of Puerto Rico, Mayaguex, Puerto Rico, on the importance of engineering testing and quality control on civil engineering construction projects.

* * *

Nine Illinois Bell Telephone Company engineers have been selected for vital work on the nation's defense projects.

They will join the Defense Projects Division of Western Electric Company in New York to assist on such projects as the Distant Early Warning Line, the Arctic Air Raid Warning Radar Network; and interception of missiles as part of the NIKE project.

Among the nine is **Frank B. Henderson,** MWSE, building engineer, named plant engineering superintendent in the Defense Projects Division. The others are Leonard W. Helke, supervising engineer; Howard R. Stevens, television engineer; and engineers Arthur W. Schaefer, Frank Drake, Richard O. Bez, Rudolph E. Hornacek, John Kocik, Jr. and Richard A. Swenson.

Henderson, who joined Illinois Bell as a lineman in 1937 following his graduation from the University of Illinois, will be succeeded by George G. Robinson, equipment engineer.

* * *

James W. Dally has been advanced to senior research engineer at Armour Research Foundation of Illinois Institute of Technology, Chicago.

A staff member since 1953, Dally has made significant contributions to the

Foundation's activities in experimental stress analysis, according to Dr. Gerhard A. Nothmann, manager of mechanical engineering research, who announced the promotion.

His major contributions have been in fatigue studies of aircraft jet engine turbine blades, dynamic properties of materials, wave propagation in continuous media, and brittle coating behavior under high loading rates.

He has published numerous papers on these subjects and served on several panels of the Society for Experimental Stress Analysis.

Before joining the Foundation, Dally was a mechanical engineer for the U. S. Gypsum and the Mesta Machine Companies.

A native of Sardis, Ohio, he received B. S. and M. S. degrees from Carnegie Institute of Technology, and at present is nearing completion of requirements for a Ph. D. in applied mechanics at Illinois Tech.

* * *

James D. Cunningham, MWSE, chairman of the IIT board of trustees and president and founder of the Republic Flow Meters Co., Chicago, has received the Alumni Association Special Recognition Award at Illinois Institute of Technology.

The award was presented on May 2, at the annual alumni reunion dinner in IIT's Crown Hall, 3360 S. State St.

A silver platter was awarded to Cunningham in recognition of his outstanding service to Illinois Tech in his 25 years on the board of trustees.

Capt. Henry W. Hemple, former chief of the Division of Geodesy, U. S. Coast and Geodetic Survey, Washington, D. C., received the Alumni Distinguished Service Award at the dinner for his exceptional services in the fields of science and technology.

Alumni Association service awards also went to IIT trustee Axel A. Hofgren, partner in the law firm of Schroeder, Hofgren, Brady, and Wegner, Chicago, and Frank J. Wise, founder and partner of Booth, Potter, Seal and Co. and the Independence Reinsurance Bureau, Philadelphia, Pa., for their long and worthy service to the alumni organization.

Cunningham is director of the Baltimore and Ohio Railroad Co., Lake Shore National Bank, Lumberman's Mutual Casualty Co., Commonwealth Edison Co., Allis-Chalmers Manufacturing Co., Belden Manufacturing Co., Blue Cross Plan, and Autogas Co., Bellwood, Ill. He also is a member of the advisory board of the Illinois Manufacturers' Association.

Capt. Hemple is 1952 recipient of a Department of Commerce medal for "a major contribution to science . . . and superb leadership in the field of geodetic engineering in the United States."

He retired from the USC&GS in 1956 after 35 years of service. Under his leadership, the two largest triangular adjustments that the coast and geological survey ever has undertaken were completed successfully.

Geodesy is the branch of applied mathematics which determines shape and area of large tracts of land, the exact positions of points, and the curvature, shape, and dimensions of the earth.

* * *

Paul Nelson, internationally-famed architect, is now associated with the New York architectural firm of Ketchum and Sharp, it has been announced by Morris Ketchum, Jr., and J. Stanley Sharp, senior partners. Mr. Nelson will specialize in research, planning and design of all types of medical buildings.

Acclaimed recently by the American Hospital Association for his contribution to hospital architecture, Nelson is the designer of the ultra-modern new St. Lo Hospital, St. Lo, France, which was built as a memorium to U. S. soldiers who died in World War II during the liberation of France.

Foremost among Nelson's innovations is the revolutionary "egg-shaped" operating room which has proven instrumental in saving many lives because it provides the optimum surgical environment and minimizes post-surgical infection through its separation of sterile from non-sterile zones.

A consultant to many French and U. S. governmental agencies, Nelson is also noted for his research hospital projects including the design of "Health City of Lille," France and the surgical pavillion of the Suez Canal hospital in Ismalia, Egypt. His research on the problem of prefabricated housing resulted in the pace-setting "Suspended House," a model of which is now in the permanent collection at the Museum of Modern Art, New York, N. Y.

Currently a visiting professor in charge of Senior Design at the Pratt Institute School of Architecture, Nelson is a member of the American Institute of Architects, Officer de la Legion d'Honneur and has recently been awarded a $10,000 fellowship of the Graham Foundation which is dedicated to the fostering of creativity in the visual arts. Nelson is a graduate of Princeton University and the Ecole des Beaux-Arts, Paris; he is a foremost advocate of humanist architecture "designed for the individual rather than mass man."

Better Mousetrap

The lowly mousetrap came to the aid of the mighty Vanguard rocket during recent tests at a missile plant, reports *Electrical Wholesaling.* Engineers had to find a way to keep a small metal door open until firing time to admit electrical cables that set the rocket off, and then have the door shut immediately afterward. Mechanism from a 25-cent mousetrap solved the problem.

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WSE Applications

In accordance with Article I, Section 5 of the By-Laws of the Western Society of Engineers, there is published below a list of applicants for admission received since the last issue of the Midwest Engineer *magazine.*

A. G. Petkus, Vice President, Procon, Incorporated, 1111 Mt. Prospect Rd., Des Plaines, Ill.

Wilbur C. Gates, Vice President, Guardite Company, Box 188, Wheeling, Ill.

Lester R. Sagar, Production Mgr., Dearborn Chemical Co., PO Box 404, Lake Zurich, Ill.

Lee W. Diestelow, Chem. Engr., Whiting Corp., Harvey, Ill.

John M. Summerfield, Research Engr., United States Gypsum Co., 1253 Diversey Pkwy.

William E. Brinker, Chief Engineer, Corn Products Refining Co., 201 N. Wells St.

L. O. Gunderson, Assist. Vice Pres., Dearborn Chemical Co., Merchandise Mart Plaza.

Bruce W. Gilbert, Office Engineer, Northern Illinois Gas Co., 615 Eastern Av., Bellwood, Ill.

Ernst W. Iversen, Supervisor of Tool Design, Link-Belt Co., 2410 W. 18th St.

James F. Zievers, Director of Research, Industrial Filter & Pump Mfg. Co., 5900 Ogden Av., Cicero, Ill.

Harvey Hennig, Section Leader, The Pure Oil Co., Crystal Lake, Ill.

Mark A. Wallace, Technical Sales Rep., Wolverine Tube, Evanston, Ill.

Lee Marchiori, Gen'l. Supt. & Est., J. S. Adams Co., 767 N. Milwaukee Av.

Spec Writing Called Absolute Necessity

"Experience has proved again and again" in the general conduct of aircraft engineering that specification writing "has become an absolute necessity," the Summer General Meeting of the American Institute of Electrical Engineers was told June 25 in Buffalo, N. Y.

P. W. Franklin of the Leland Electric Co., Dayton, Ohio, reported, in a paper presented at the meeting, that specifications, though they are "often obnoxious to many highly gifted engineers" have been within the last decade, "accepted as major tools and means of transfer of information in the general conduct of aircraft engineering."

Specifications, he said, are "in a common class with legal codes and military orders and instructions," and should be "worded beyond the possibility of personal misinterpretation . . . providing a completeness of coverage excluding both absence of information and contradictory statements."

"In a certain way," he continued, "a specification must approach the precision of unique definitions used in a mathematical approach, but unfortunately it must do this with words which, for this purpose, are a relatively poor tool. This attempt to define closely a complex of ideas, features, and interrelated performance by word is often obnoxious to many highly gifted engineers, to whom it appears as red tape, hair splitting and unnecessary skullduggery. Unfortunately, as experience has proved again and again, the definition of objectives and requirements beyond doubt and misinterpretation in technical work has become an absolute necessity, particularly if communication between separated and specialized groups and proper maintenance of records are involved."

The three major points, he said, which must be covered in any technical specification are: rating and performance or what the equipment will do; available weight and bulk allowance, environment or under what conditions it will operate; and verification of performance guarantees or qualification tests.

Executive Techniques Seminar is Scheduled

The second annual "Executive Techniques for Industrial Engineering" seminar sponsored by the Industrial Management Society will be held Nov. 4-5, 1958 at the Hotel Sherman in Chicago.

This two-day workshop is designed to search out answers to the problems involved in industrial engineering's management phase, and is open exclusively to top echelon industrial engineers with executive responsibilities.

The 22nd Annual National Industrial Engineering and Management Clinic sponsored by the Industrial Management Society, will be held Nov. 6-7, 1958 at the Sherman Hotel.

Industrial engineers, works managers, plant superintendents, and production executives will hear reports of the latest developments in the fields of time and motion study, work simplification, job evaluation, methods, production control, plant layout, materials handling and human relations.

IIT Installs New Thousand-Ton Press

A $150,000, thousand-ton-capacity press for research and development work on metals has been installed at Armour Research Foundation of Illinois Institute of Technology, Chicago.

The press will be used to fabricate certain metals by extrusion (forcing heated metal through an opening) and press forging (changing the shape of hot metal by squeezing between two die faces), according to Orville T. Barnett, assistant manager of metals research at the Foundation.

Built specifically for ARF by the Hydraulic Press Manufacturing Co., the press, which weighs 78 tons, will enable metals researchers to work with alloys that cannot be shaped by rolling or hammer forging, Barnett said.

Among such alloys are those used in nuclear power engines, jet engines, missiles, and atomic power reactors.

In addition, the press can be used in fabricating die materials for forming thin alloy sections needed in aircraft components, he added.

Beneath the press are a 12-foot extrusion collection pit and a 32-foot well for collecting longer extrusions, which, combined, will allow the press to run 40 to 45-foot extrusions, Barnett said.

The press and extrusion collection pit are supported by four caissons which extend 53 feet down to hardpan below the ARF Metals Research Building.

A 350-gallon oil-nitrogen bottle operating at a working pressure of 2,200 pounds per square inch is used to operate the press at full tonnage with speeds up to 600 inches a minute.

The press also may be used as a 256,000-pound-capacity tensile machine capable of adjustable crosshead velocities of up to 250 inches a minute, Barnett said.

Special electronic controls for the press are being developed by ARF to provide extreme flexibility for research and development work.

Calls for Liberalized Education

"It is time" that engineers be considered men and women of "sensibilities" whose growth "should not be stunted by educational methods designed merely to turn out well-trained technicians," James H. Campbell, senior vice-president of Consumers Power Co., Jackson, Mich., said May 6, in East Lansing, Mich.

Speaking on the Michigan State University Campus at the closing dinner of the Great Lakes District Meeting of the American Institute of Electrical Engineers, Campbell warned against graduating from the nation's colleges engineers who are little more than "clever gadgeteers." He called for a "liberalized" education containing the humanities in an undergraduate program of at least five years.

A liberal education, he said, will "pay tremendous dividends" in developing engineers as leaders and organizers of men in industry and society.

"Engineers," he said, "should be cognizant of the human as well as the mathematic equation. In the positions and responsibilities they will hold in the coming space age, their interests should radiate beyond their technical activities."

At present, he said, engineers, "steeped in technical training" too often find themselves "insulated" from human affairs.

They are more likely to have narrower scopes and be more isolated from human activities than other professional men and women, he said. One important reason for this, he pointed out, is that universities and colleges are trying "to squeeze into four years of intensive engineering education" what students of other major professions receive in five, six or seven years of study.

"Lengthening of undergraduate programs for engineers to at least five years with the inclusion of more of the humanities, seems indicated," he said.

Specialization should be avoided in these programs, he emphasized, and a broad background sought. Unfortunately, however, industry has so far made specialization "'pay off'," he said.

He urged industry to be "as ready to revamp its manpower concepts as it is to change its machine concepts." Universities must be responsible for the implementation of a new, liberal education, he said, but industry must cooperate by stopping the practice of regarding colleges mainly as "shopping places where it can look for finished technical products."

One of the most important results of a liberal education, he said, will be the forming of a "flexible mental attitude" which will aid the engineer to develop his ability to listen and communicate effectively and intelligently.

Today, he said, industry is "plagued" by rigid-thinking, unimaginative people, educated under inadequate or "cheapened" scholastic standards and unable to communicate effectively or understand ideas.

Nike Hercules being Produced in L. A.

Ground handling and launching equipment for the atomic-capable Nike Hercules air defense guided missile is being produced in Los Angeles in quantity for Douglas Aircraft Company by Consolidated Western Steel Division of United States Steel Corporation. The launchers were scheduled to go into service in Chicago in June.

The U. S. Steel unit has been fabricating for several months on a production basis the complete launching and major segments of the ground handling equipment for the missile.

The Nike Hercules, a superior model of the nation's first combat-ready guided missile, can engage and destroy enemy aircraft at higher altitudes and longer ranges than the supersonic Nike Ajax.

Consolidated Western is producing component parts at its South San Francisco plant and at its Vernon and Maywood plants in Los Angeles. Most of the work is being done at the latter location where the equipment is assembled and test-erected before shipping.

Never been Touched

Pulling the hides off hot dogs has become mechanized, *Product Engineering* says. No human hands touch the wieners as they go through a peeling machine that cuts and unwinds the casings.

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Nearly 1,000 home study courses are now available from schools which meet professional standards. Courses include accounting, art, business, drafting, engineering, electronics, radio-television repair, and many other subjects. On request the National Home Study Council, Washington 5, D.C., will send a directory of schools meeting its standards.

Electric Process Discussed

A present avenue of scientific inquiry, one that is investigating the direct generation of electricity from heat, is currently exciting the minds of research people the world over.

This process involves the use of a power plant known as a thermoelectric generator. And, of particular importance, unlike today's conventional steam generating plants which are large and complex, the thermoelectric generator is small, compact and has no moving parts.

It is operated on the principle that when certain materials are joined together, then subjected to external heat, d.c. current is generated.

According to Dr. Eugene Wainer, vice president and director of research of Cleveland's Horizons Incorporated, the possibilities of thermoelectric power generation, while exciting, are not really new.

"Actually," Dr. Wainer states, "they have been known for many years, although progress has been limited by the low efficiencies of available materials.

"Recent advances in solid state physics, providing new materials, however, plus better understanding of the design and construction of thermoelectric generators have resulted in renewed interest and effort in the design and employ of these devices."

Horizons' director of research points out that an important consideration is the selection of a heat source which will best activate material to produce the desired current.

At present, he states, heat from nuclear fission and the rays of the sun command the most thinking. Even so, successful experiments have been carried out utilizing heat generated by as simple a material as kerosene.

"The use of nuclear reaction to power conventional steam turbines has received much publicity. However, such generation itself, presents many complicating problems, primarily due to existing temperature limitations in materials used in atomic pile construction. In addition, the efficiencies available from a steam turbine, in itself represents a sharply limiting factor.

"And," he cautions, "even if this efficiency level is raised, and it is assumed that this can be done, the basic problem of size and complexity of the steam turbine itself, would not be solved."

Dr. Wainer points out that "accordingly, scientists thinking toward the future are more concerned with the use of nuclear piles as a heat source for thermoelectric generators, than for steam turbines."

Another avenue of scientific inquiry relative to a heat source is the sun, well appreciated as our most abundant and least expensive source of heat and one which would provide an inexhaustible source.

"Harnessing this power," Dr. Wainer concludes, "has been mankind's dream for generations, and the anticipated success of thermoelectric research is now bringing this dream closer to reality.

"And, in fact, the sun's rays are already powering telephone transmission lines in rural U.S. test centers."

ParcelAir Starts New Air Service

ParcelAir, a new method of shipping by air which will provide one to three-day delivery service to any town in the United States at rates comparable to surface transportation, was announced recently by Al Krause, president of American Shippers, Inc.

"The new ParcelAir System marks the first step in solving one of the greatest problems of manufacturers and merchandisers—rapid, reliable, low-cost delivery to and from distant points," Krause said.

Krause stated the new door-to-door concept in nationwide shipping will speed up the entire tempo of commerce at costs the average businessman can afford. It combines, he said, fast air freight with truck or parcel post delivery, handling packages of any dimension up to 40 pounds each.

ParcelAir System service began simultaneously in New York, Boston, Los Angeles and Chicago, with San Francisco and other terminal points slated to open soon, Krause said.

Comparing the various types of transportation and their rates, Krause pointed out that a 20-pound package shipped by air express from Los Angeles to New York, with $50 insurance coverage, would cost $17.08. By air freight, he said, it would cost $19.70, by air parcel post, $16.20; and by ParcelAir, only $4.90. Ground transportation by rail express was quoted at $5.42, with straight parcel post, $3.95.

The market potential for ParcelAir, Krause said, can be visualized by the number of parcel post packages forwarded through post offices. In New York City, he said, 1,250,000 parcel post packages are mailed each week day; in Chicago, more than 900,000; in Los Angeles, nearly 80,000. By ParcelAir, Krause stated, from 50 to 60 per cent of the transportation time would be saved on such shipments and at a comparable cost.

Key to the simplicity and economy of the operation, Krause said, is the use of ParcelAir stamps to prepay and predetermine the door-to-door costs of the new service. A chart provided each shipper lists state-to-state rates, rather than zone rates, with the costs of shipping the same to any locality within the state.

The preparation of a single shipper's manifest, which accommodates up to 20 separate shipments, is the only record required to ship by ParcelAir, Krause said. Eliminated are individual waybills, auditing, the delays in billing while waiting for forwarding charges, the issuance of separate checks, and calls to determine freight rates that are applicable.

Similar savings in time and manpower, Krause pointed out, have enabled American Shippers and its new division, ParcelAir System, to offer its new combination service at low cost. The company has eliminated two-thirds of its paper work, he said; there is no billing as all charges are prepaid; and streamlined handling of ParcelAir packages has further reduced internal expense.

Although each ParcelAir shipment is automatically insured up to $50, Krause stated, insurance up to $1500 per package can be obtained by affixing additional stamps at the rate of 15 cents per $100 coverage.

Time Was ...

There was a time when Russians actually wore shoes with steel soles, *American Machinist* comments. This was in the 13th century, and the wearers were tribesmen who inhabited the lower Central Ural Mountains. The soles were an inch thick, and were grooved to prevent slipping. Being absolutely rigid, they had no give, and probably were uncomfortable. But they were economical.

✓Check these

6 Reasons why **Midwest Engineer** is a good place to advertise

- ✓ **Midwest Engineer's** circulation is in America's industrial and residential heart.
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Western Society of Engineers

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Chicago 1, Illinois

How many of these electric helpers have you added since 1947?... asks LITTLE BILL

☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i

You're an average family if—in the postwar years you've added six new electrical appliances. Shown here are a few typical examples.

This is why you're using far more electricity nowadays than you did just a few years ago. And why life is a lot easier. But of all the things you buy today, electricity has gone up *less* than almost anything else.

So, while your bill may be a *little* higher, electricity is actually doing nearly twice as much work for the money now as it did years ago.

See how little it costs to run each of these electric helpers.

a—Automatic washer—3 loads for 1¢. Saves hours of work each week.

b—Electric dryer—6¢ a load is all you pay to dry the clean electric way.

c—Hi-Fi—5 hours for 1¢. 10 long-playing records played for a penny's worth of electricity.

d—TV set—2 hours for 1¢—The world's finest entertainment for pennies a day.

e—Sewing machine—runs 5 hours for 1¢. (Easy way to stretch your clothes budget.)

f—Refrigerator—3¢ a day. New under-counter model is handy for soft drinks, ice, or snacks.

Other appliances shown include: **(g) Steam iron**—Glides along easily on its own cushion of steam for 1 1/3¢ an hour, **(h) 150-watt lamp**—Good reading light costs but a penny for 3 full hours, **(i) Electric clock**—the exact time, just 1¢ a week.

"Electricity costs less today, you know than it did 25 years ago!"

Commonwealth Edison
AND
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